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ORIGINAL ARTICLES.

SOME PITFALLS IN THE STATISTICAL STUDY OF TUBERCULOSIS.

By PERCY STOCKS,
M.A., M.D., B.CH., D.P.H.,
Reader in Medical Statistics, University of London; and Medical Officer, Galton Laboratories, University College.

There are few, if any, diseases which offer a more fascinating field of investigation to the medical statistician than tuberculosis. The explanation for this is to be found no doubt in the great variety of problems which the disease presents for statistical solution, and the many subtle fallacies which are liable to pass unnoticed in dealing with them. It is impossible in the space of a short article to do more than mention a few of the pitfalls which await the unwary, and I have therefore chosen some which may be of special importance in view of two problems which are at present engaging the attention of those interested in tuberculosis.

Investigations into the Relative Importance of Infection by the Tubercle Bacillus and Constitutional or Acquired Resistance to it.

Any useful study of the potency of inherent or artificially produced immunity in combating infection by the tubercle bacillus must necessarily involve the use of control groups, with whom are contrasted certain selected groups, such as children born of tuberculous mothers, or infants who have been subjected to some form of immunizing treatment. A study of the literature of the last few years dealing with investigations of this kind shows that the most contradictory conclusions have been arrived at, both as regards the influence of hereditary factors in the resistance to infection, and as regards the usefulness of protective inoculation of infants of tuberculous parentage. It is unfair to the statistical method to deduce from this that the method

leads us nowhere, for we have only to look more carefully into some of this work to perceive that it has been spoilt by the introduction of the most serious fallacies in the choice of control groups.

An example of a pitfall in this connection is the use of patients attending tuberculosis institutions who have been diagnosed as non-tuberculous as a control group for contrast with the tuberculous in the study of heredity. I have more than once pointed out[1, 2 (a)] that since a very large proportion of the former group of patients have come or have been brought to the dispensaries for the sole reason that they have a tuberculous family history, it would be difficult to find a more unsuitable control group for such a study. The principle to be emphasized here is that *the causes which have led to the formation of the control group must be independent of the special factors which are being investigated* (in this case family history of tuberculosis). This is usually ensured by using as control group the entire population, and thus eliminating selection of any kind from the control group.[2, 3] What is liable to be forgotten when this is done is that this control group contains within it all the sub-groups which are being contrasted with it, from the worst to the best. Thus if we were to find that children in households containing a sputum-positive case of tuberculosis have a smaller expectation of life than children in the general population, whereas children in households containing a sputum-negative case have the same expectation as children in the general population, we must bear in mind in the latter case that our control group (the general population) contains a proportion of sputum-positive households, whereas our sputum-negative group does not, and it would not therefore be a valid conclusion that the presence of a sputum-negative case in the house had no effect on the children's expectation of life. In a useful research on these lines recently carried out in Lancashire[3] Dr. Lissant Cox and his colleagues found that the death-rate from non-pulmonary tuberculosis in children aged two to five years was nineteen times greater in sputum-positive households than in the general population. It may be estimated that some 2 or 3 per cent. of households have a person with positive sputum, and it therefore follows by a simple calculation that the death-rate to be expected from non-pulmonary tuberculosis in children aged two to five in *all households not having a sputum-positive case* would presumably be only about half the general rate used as control (since 2 to 3 per cent. of households with death-rate nineteen times enhanced have been excluded). Actually this rate in households having a sputum-negative but no sputum-positive case was found to be eleven times the control rate, and hence if this could be taken as the true ratio* it would follow that in this sub-group of households the expecta-

* The numbers of deaths were not large enough to be certain of the significance of this ratio, as the report points out.

tion of dying from non-pulmonary tuberculosis for children aged two to five would be some twenty times that expected when infection by sputum has been excluded from the control group as well as from the sub-group itself. I have taken this example, not with any desire to criticize what is in many respects a model piece of research of its kind, nor to suggest that Dr. Lissant Cox and his co-workers have drawn any but sound conclusions from the figures they have obtained, but in order that we may all be alive to some pitfalls which might easily escape us in work of this nature.

Investigations into the Comparative Values of Sanatorium and Domiciliary Treatments as judged by the Mortality or Progress of Groups of Patients subjected to the Two Forms of Treatment.

Studies of this important question are beset with difficulties, but these difficulties are not, I believe, too great to be surmounted. A few years ago a discussion of some of the fallacies which are here involved took place in the correspondence columns of the *British Medical Journal*[4] as a result of a statistical analysis of data of this kind from Belfast,[5] but I think that from a consideration of subsequent work something useful may be added to the points which were brought out then. The pitfalls we need to look out for here are chiefly concerned with the actual formation of the groups whose progress is contrasted, and of these I will mention four.

(*a*) There is a fallacy inherent in the *differentiation of "sanatorium treated" from otherwise treated*, because the former group has to be limited to those who have completed a certain minimum period of, say, two or four weeks, or two months, at a sanatorium, and the deaths occurring within a certain period, say three or five years, in this group are contrasted with those in a corresponding period in the residual group of dispensary or home-treated cases who did not qualify for this category. From the time of coming under observation to admission to the sanatorium there is also a latent period whose average varies in different areas. Under ordinary conditions it would average about two months, so that if we add this to the minimum period at the sanatorium, for which two months is also the favoured time, we may take it that the "sanatorium-treated" group must survive on the average about one-third of a year in order to qualify for the group at all, whilst the general effect will be that those who die before this period is accomplished automatically pass into the otherwise-treated group. Strange to say, it is not perceived that this method of grouping alone gives at the outset a considerable advantage in survival to the sanatorium-treated patients; thus one would not be far wrong in estimating that 4 or 5 per cent. of incipient cases and 10 per cent.

of moderately advanced cases die within four months of first coming under observation, and where the average "latent period" is longer than two months, as it is in some areas, the advantage given to the sanatorium-treated group as regards survival will be even greater than this. For a fair comparison it is necessary to exclude all cases dying within the mean latent *plus* minimum residence period from the non sanatorium group as well.

(*b*) The *age constitution* of the groups compared may be different, giving an advantage as regards survival to one or other group. This can be eliminated by using the ratios of actual deaths to deaths expected from life-table populations of the same ages, a method which has been applied in several studies of the after-histories of sanatorium patients.[5, 6]

(*c*) It is usual to exclude from the gross totals of patients treated at a sanatorium or at home, as the case may be, large groups of suspect cases with *diagnosis not confirmed.* An error is likely to arise here because the examination must necessarily be more searching, since opportunities for continuous observation are more complete, on the whole, in the case of the sanatorium-treated group than the home-treated, and hence, whilst it may be safely assumed that the great bulk of patients thus classed after a stay at a sanatorium are non-tuberculous, this will not so surely be the case with those who have not been under observation at the sanatorium. In the latter case the "diagnosis not confirmed" group will contain a large number who for one reason or another have not been observed frequently enough to be able to detect definite signs which would certainly have been detected given more opportunities for observation, as during residence at a sanatorium. It therefore follows that when we throw out this large group of "suspect" cases from the sanatorium-treated group and from the residual group, we are in the second instance, but not in the first, throwing out a certain proportion of the mildest cases of tuberculosis, and thereby prejudicing the survival rates of the residual group as compared with the sanatorium group. Thus in one area I noted that 818 out of 2,936 patients were rejected under this head from the home-treated group, but only 367 out of 2,803 from the sanatorium-treated group, so there was here possible scope for the introduction of a considerable error on this basis. For safety it would be wise to calculate the survival rates of definite *plus* suspect cases in each instance as a check upon the rates for the definite cases alone.

(*d*) A similar kind of error also affects comparisons between *sputum-positive groups* of pulmonary cases. Such groups are, of course, not liable to any doubts as to diagnosis, and are therefore generally regarded as free from fallacy, but it must be remembered here that the more searching the examination for the tubercle bacillus, the more

of the milder cases are included in the T.B.+ group, and hence the average progress of T.B.+ groups is to some extent dependent on the thoroughness of the bacteriological examination employed. Thus a group of patients in whose sputa T.B. had been found at the first examination would be expected to give a worse mean survival rate than another group in whose sputa T.B. had been found by the time ten examinations had been done.

In order to explain my point more clearly I have selected some figures from two recent reports: (A) Tuberculous cases discharged from King Edward VII. Sanatorium, Midhurst, from 1906-07 to 1926-27[7]; (B) nett number of tuberculous adults who had sanatorium treatment in Lancashire for two months or more, 1914-23 (Reference 8, Table E); (C) nett number of adults who received home or dispensary treatment in Lancashire, 1914-23 (Reference 8, Table F); (D) percentages dead in 1924 of patients coming under observation during 1919-23 in Lancashire—*i.e.*, after a mean interval of about three years (Reference 8, p. 83).

Turban-Gerhardt Groups.	A.				B.			
	T.B.+	T.B.-	Total.	Per Cent.+	T.B.+	T.B.-	Total.	Per Cent.+
I.	541	750	1,291	41·9	1,071	1,303	2,374	45·1
II.	1,604	440	2,044	78·5	1,609	468	2,077	77·5
III.	1,525	103	1,628	93·7	223	66	289	77·2
	3,670	1,293	4,963	—	2,903	1,837	4,740	—

Turban-Gerhardt Groups.	C.			
	T.B.+	T.B.-	Total.	Per Cent.+
I.	443	772	1,215	36·5
II.	1,817	698	2,515	72·2
III.	2,209	652	2,861	77·2
	4,469	2,122	6,591	—

D. Percentages of 1919-23 Cases Dead in 1924.

Turban-Gerhardt Groups.	Sanatorium Treated.			Otherwise Treated.		
	T.B.+	T.B.-	Total.	T.B.+	T.B.-	Total.
I.	50·6	8·6	28·5	63·8	23·0	38·0
II.	62·6	16·0	41·2	82·1	47·9	72·6

It will be noted first from A, B, C that a smaller percentage of the home and dispensary treated cases (C) than of the sanatorium-treated cases (A, B) had positive sputum in Groups I. and II., and of this there are two possible explanations:

(i.) That the difference is due to more complete and repeated search of sputa for T.B. in the sanatorium-treated cases than in the residual cases on the whole. This would mean that the T.B. – sub-group of Group I. patients included in the case of the home-treated (C), but not in the case of the sanatorium-treated (B), about 8½ per cent. (*i.e.*, 45·1 *minus* 36·5) who had scanty T.B., which would have been found after further repeated examinations. These might be supposed to have a prognosis intermediate between the T.B.+ and T.B.– groups, and for the sake of argument we may assign to them an expectation of ½ (50·6 + 8·6) = 29·6 per cent. dead in three years and transfer them to the T.B. + group, and we should then have the following corrected figures for comparison in place of (D) "otherwise-treated, Group I.," patients:

T.B. + : 36·5 per cent. subject to 63·8 per cent. mortality *plus* 8·6 per cent. subject to 29·6 per cent. mortality in three years, giving a corrected value of 57·3 per cent. mortality, which has to be contrasted with 50·6 per cent. in the corresponding sanatorium group.

T.B. – : 63·5 per cent. subject to 23·0 per cent. mortality *minus* 8·6 per cent. subject to 29·6 per cent. mortality, giving a corrected value of 22·0 per cent., very little different from the uncorrected figure.

It would be more simple on this assumption to compare progress of the *whole* groups rather than of the T.B. + sub-groups alone (sanatorium-treated, Group I., 28·5 per cent. mortality in three years; otherwise-treated, Group I., 38 per cent. mortality in three years).

(ii.) The difference may be entirely due to a greater tendency for the T.B. + patients to go to a sanatorium than for T.B. – patients, being more convinced of the diagnosis. In this event the comparison of T.B. + groups is sound, and if the whole groups be compared the progress of the sanatorium-treated will be prejudiced.

Since we do not know which of the above is the correct explanation, the only safe plan is to compare *both* (1) T.B. + sub-groups and (2) whole groups (combining T.B. + and T.B. –) as to progress. If they agree in giving a significant advantage to the one, after the possible sources of error (*a*), (*b*), (*c*) have also been excluded, conclusions may then safely be drawn. In this particular data both comparisons for Group I. give an advantage of about 10 per cent. more alive after three years to the sanatorium-treated; but it must be noted that the other factors (*a*), (*b*), (*c*) have not been corrected for, and of these (*a*) and (*c*) undoubtedly give an apparent advantage to the sanatorium-treated which might easily amount to 10 per cent.

Space does not allow any further excursions into this subject. The use of somewhat more elaborate statistical methods has been illustrated in my analysis of the Belfast data,[8] but it has here been my endeavour to see with what confidence we may employ the simpler methods. The examples I have chosen here have not been selected in any critical spirit, but I think they make it clear that even in regard to the best analyses of data which have so far been made by employing the simpler methods of comparing actual mortality of groups of patients within a definite period of time, it cannot be said that sources of fallacy in the formation of the groups compared have been excluded with sufficient certainty to enable us to say whether sanatorium treatment does or does not, other things being equal, give the expectation of better ultimate progress than home and dispensary treatment. By taking carefully into account and allowing for the possible sources of error I have drawn attention to, I do not think it is impossible on these lines to reach a definite conclusion on this important question.

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TUBERCULOSIS SURVIVALS:

THE MORTALITY EXPERIENCE OF THE CASES OF PULMONARY TUBERCULOSIS NOTIFIED IN IPSWICH SINCE 1909.

BY ARTHUR M. N. PRINGLE,

M.B., C.M., D.P.H.,

Medical Officer of Health and Tuberculosis Officer for the Borough of Ipswich.

BETWEEN the commencement of the notification of pulmonary tuberculosis in 1909 and December 31, 1928, 3,114 persons were notified in Ipswich as suffering from pulmonary tuberculosis. Of these, 1,613, or

TABLE A.—INDICATING NOTIFICATIONS OF CASES OF PULMONARY TUBERCULOSIS IN IPSWICH AND AFTER HISTORY.

Year.	Number of Cases Notified.	Deaths occurred as under—																				Total Dead.	Left Town or Lost Sight of.	Remaining Alive December 31, 1928.
		1909.	1910.	1911.	1912.	1913.	1914.	1915.	1916.	1917.	1918.	1919.	1920.	1921.	1922.	1923.	1924.	1925.	1926.	1927.	1928.			
1909	64	34	8	5	1	2	1	1	1	1	2	—	—	1	—	1	—	—	—	—	—	58	4	2
1910	44	—	20	8	3	2	—	1	—	—	—	—	2	—	—	—	—	—	—	1	—	37	4	3
1911	132	—	—	31	25	8	12	4	2	2	2	1	—	—	—	1	1	—	—	1	—	90	18	24
1912	330	—	—	—	80	29	14	10	7	5	8	3	—	5	6	3	3	2	1	—	1	177	58	95
1913	200	—	—	—	—	60	14	8	5	4	4	3	3	3	2	1	1	—	3	2	2	115	31	54
1914	156	—	—	—	—	—	44	23	2	6	5	2	1	2	3	1	1	1	—	1	1	93	22	41
1915	116	—	—	—	—	—	—	34	20	4	6	—	2	—	1	1	1	—	—	—	—	69	14	33
1916	168	—	—	—	—	—	—	—	55	24	5	7	3	6	1	—	2	—	1	1	1	106	18	44
1917	155	—	—	—	—	—	—	—	—	52	24	7	3	5	—	—	—	2	2	—	1	96	19	40
1918	178	—	—	—	—	—	—	—	—	—	64	12	9	7	1	2	2	2	2	3	—	104	31	43
1919	164	—	—	—	—	—	—	—	—	—	—	57	16	9	4	6	2	3	1	2	—	100	20	44
1920	137	—	—	—	—	—	—	—	—	—	—	—	46	21	10	4	1	3	2	1	—	88	11	38
1921	304	—	—	—	—	—	—	—	—	—	—	—	—	37	21	5	11	3	3	4	1	85	32	187
1922	155	—	—	—	—	—	—	—	—	—	—	—	—	—	43	15	3	7	—	2	1	71	13	71
1923	133	—	—	—	—	—	—	—	—	—	—	—	—	—	—	32	14	12	3	1	2	64	11	58
1924	141	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	32	15	10	5	1	63	17	61
1925	146	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	38	16	8	8	70	8	68
1926	123	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	26	13	7	46	12	65
1927	127	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	36	11	47	8	72
1928	141	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	34	34	5	102
	3,114	34	28	44	109	101	85	81	92	98	120	92	85	96	92	72	74	88	70	81	71	1,613	356	1,145

51·8 per cent., are known to be dead; 1,145, or 36·7 per cent., are known o be alive; and 356, or 11·4 per cent., have been lost sight of. In the light of these figures it is not unreasonable to estimate that at least one-third of those lost sight of are dead, thus raising the total of the dead to 1,732 and the proportion to 55·6 per cent. of the notifications.

These crude figures require some examination in order to determine their real meaning in the light of the evidence yielded by the accompanying Table A.

Table A shows at a glance the number of cases notified in each year, the number of deaths of these persons in each subsequent year, and in the last three columns the total deaths, total survivors, and the total lost sight of. There are several points in the extended Table A which are emphasized if it be split up into six equal periods of three years and one of two years (1909-1910), the reason for this being because the notifications in 1909-1910 applied to Poor Law cases only, whereas those for the subsequent periods include all persons; thus Table B results.

TABLE B.—SHOWING THE NUMBERS AND PROPORTIONS OF CASES DEAD, ALIVE, AND LOST AS COMPARED WITH THE NOTIFICATIONS FOR THE SAME PERIODS.

Periods.	Number Notified.	Dead.		Alive.		Lost.	
		Number.	Per Cent.	Number.	Per Cent.	Number.	Per Cent.
1909-1910	108	95	87·9	5	4·6	8	7·4
1911-1913	662	382	57·7	173	26·1	107	16·1
1914-1916	440	268	60·9	118	26·8	54	12·2
1917-1919	497	300	60·3	127	25·5	70	14·1
1920-1922	596	244	40·9	296	49·6	56	9·4
1923-1925	420	197	46·9	187	44·5	36	8·5
1926-1928	391	127	32·4	239	61·1	25	6·4
Total	3,114	1,613	51·8	1,145	36·7	356	11·4

From Table B it is seen that for all practical purposes the 1909-1910 group has been wiped out, there being only five known survivors. The group 1911-1913 provides naturally the greatest number of cases, as it includes the commencement of full notification, but in addition some sixty-seven cases were notified from the schools in 1912, of which twelve only are known to be dead, thirty-eight are known to be alive, and seventeen have disappeared. These school children account for the comparatively low mortality percentage in this period, but they quite certainly do not explain the high number of the lost. The explanation of this feature no doubt lies in the war movement of the population, which in Ipswich was considerable.

The six years 1914-1919 show similar proportions of mortality, etc., but the percentages are misleading, especially for the period 1917-1919, because, owing to absence of staff, a considerable number of cases recognized at the dispensary were not included, but appear in the period 1920-1922. This fact accounts for the low proportion of dead in that period and the high proportion of survivors, since the great majority of these dispensary cases were young, thus providing an experience practically identical with that of 1912.

The last period of six years, in the comparatively low proportion of deaths and the high proportion of survivors, merely corroborates the facts of the previous periods in Table B and the whole lesson of Table A. Examination of Table A reveals the further fact that by far the greatest number of deaths occur within one year of notification, and that the number of deaths diminishes rapidly as the date of notification recedes. To elucidate this point I have extracted Table C, which shows the total number of deaths recorded for each year after notification.

TABLE C.—SHOWING THE LENGTH OF TIME (IN YEARS) ELAPSING BETWEEN NOTIFICATION AND DEATH IN THE FATAL CASES.

Number of Years.	Number of Deaths.	Per Cent. of Notification.
1	855	27·4
2	329	10·5
3	129	4·1
4	101	3·2
5	43	1·3
Total under 5	1,457	46·7
6	37	1·1
7	28	0·9
8	17	0·5
9	17	0·5
10	16	0·5
Total 5 to 10	115	3·7
+10	41	1·3
All ages	1,613	51·8

Thus it appears that more than one-half of the recorded deaths occurred within one year of notification and 90 per cent. within five years. Table C also shows further that over 46 per cent. of the notified cases were dead within five years and over 27 per cent. within one year. The proportion dying within the first year is a little lower

at present; thus for the last six years it has been about 24·4 per cent. On the other hand, the deaths during the second year were just over 10 per cent. of the notifications for the six years ending 1927 as compared with 10·5 per cent. for the whole period. For the third year the average experience of today corresponds very closely with the average of the whole period.

In conclusion it may be well to point out that the local tuberculosis scheme for Ipswich is singularly well equipped for securing the provision of prompt institutional treatment for all cases requiring it. The proof of which is the fact that every tuberculosis case suitable for sanatorium treatment has had it provided at once ever since 1912. Further, every case requiring hospital treatment has been admitted almost at a moment's notice, and cases of non-pulmonary tuberculosis have been in receipt of efficient treatment readily available over a considerable number of years. Any suggestion, therefore, that lack of facilities for treatment can have had any effect upon the mortality returns does not apply so far as Ipswich is concerned.

TUBERCULOSIS IN THE TROPICS.

By H. HAROLD SCOTT,

M.D., F.R.C.P., D.P.H., D.T.M.H. CAMB., F.R.S. EDIN., F.Z.S.,

Medical Secretary, Colonial Medical Research Committee; Late Pathologist to the Zoological Society of London.

To treat adequately in a single brief article a vast and important subject such as tuberculosis occurring under tropical conditions is clearly impossible. We can deal only with one or two aspects. Tuberculosis is a terrible menace to all native races, taking a heavy toll of lives; it is a reaper demanding and receiving an ever-increasing harvest.

The Distribution of Tuberculosis.

Tuberculosis is rare, even absent, in certain isolated spots, such as the Upper Zambesi, parts of the Cameroons, and the interior of the Transvaal; this rarity is due, not to immunity, but to non-introduction of the tuberculous organism. The experiences in Bahr-el-Ghazal have been repeated so often that a mere mention will suffice. When the European enters, together with the tubercle bacillus, there is a different story to tell. Primitive tribes are intensely susceptible to tuberculous infection, because in the absence of the tubercle bacillus there is no stimulus to elaboration of protective bodies, whereas civilized peoples have from their earliest days been exposed to infection and have

consequently to a large extent acquired some measure of protection. Thus Holmes, in 1913, when speaking of the Australian aborigines, stated that in those of the Northern Territory the disease runs a rapid course, and the individuals attacked were those who had come in contact with civilization; he found no cases among the wild blacks. Yet again, in a recent report (1927) on the health of the Virgin Islands, appears the statement that pulmonary tuberculosis is common, and "it is a strange fact that nearly all patients who have presented themselves for treatment are people who have worked in New York and have returned on account of ill-health."

People at home are hardly aware of the ravages of this disease among native races. A few figures from recent accounts treating of our own British colonies, dependencies, and protectorates first will therefore be interesting and informative. In Ceylon, in 1927, there were 3,595 deaths, and the average for the preceding ten years was 3,668; it is estimated that there are 631 cases per million of the population. Of these the pulmonary form preponderates very largely, constituting 93 per cent.; in Africa we have Kenya, with 453 cases in 1926 and 56 deaths; 634 (a 40 per cent. increase) in 1927, with 112 deaths. These figures refer merely to cases in Government hospitals and dispensaries; recent investigations in several native reserves suggest that the incidence is so considerable as to become "a formidable menace to the health of the community," for the conditions under which the native lives in the reserves are such as to favour abundantly the spread of the disease. In the Gambia, between 1911 and 1919, tuberculosis accounted for 2·6 per cent. of all deaths, in the next five years for 4·6 per cent., and in 1927 for 8·12 per cent., almost a doubling of the mortality rate in three years.

It is interesting to note, in view of statements which will be made later, how that as morbidity rises the mortality rate falls. Thus, in Fiji in 1925 there were 391 cases recorded and 84 deaths; in 1926, 438 cases with 93 deaths (21 per cent. mortality); in 1927, 621 cases and only 73 deaths (11·7 per cent.). In Nigeria a similar state of affairs obtains: in 1926 there were 785 recorded cases, with 124 deaths, a mortality rate of 15·8 per cent.; in 1927, 806 cases, with 17 deaths (2 per cent.). Rarely, of course, is the fall so great as this, and it must be remembered that these figures apply to cases coming under treatment and therefore recorded. They give no reliable idea of the actual incidence, for natives do not readily seek treatment, and many more are seen when a tour of the villages is made.

In Mauritius, on the other hand, where a tuberculosis officer has been working, the infection rate for Port Louis was found to be between 3·4 and 4 per cent.; in the country districts much less, and the general rate is probably about 0·6 per cent., on which basis it is estimated that

there are approximately 4,000 tuberculous individuals in all; the deaths had fallen from 768 in 1926 to 485 in 1927.

Since, however, the above figures themselves fall short of expressing the actual incidence, we will quote a few statements by men on the spot, many of whom have worked in the same place for years and whose opinions consequently bear weight. These will not be restricted to British possessions in case we may be regarded on the one hand as deeming ourselves the only Europeans of importance, and on the other as not being willing to share with others the onus of introducing tuberculosis to the natives. In Cochin China "tuberculosis is second only to malaria as a menace"; the Saigon Pasteur Institute found "55 per cent. of the population positive" (? to von Pirquet). Of 1,028 individuals tested in Irebu, Belgian Congo, 221, or 21·4 per cent., were found. Frimodt-Moller records in 1927: "The disease is spreading in all climates in India, even in those which are favourable, when once the infection has gained entrance. . . . It is spreading rapidly amongst the educated classes and the more prosperous communities in spite of the comparatively improved hygiene they enjoy." In the Gold Coast in 1927: "Tuberculosis again shows an increase. . . . It is difficult to estimate accurately the extent to which tuberculosis is really increasing." In Sumatra (Padang, West Coast), on an examination of 2,000 natives, 14·7 per cent. of the children reacted positively, and also 36·7 per cent. of the adults. In the Karo districts, 7,300 were similarly tested, and radiological and clinical examination was made of 2,694. In communities of more than 500 inhabitants Paneth in 1928 found 30 per cent. of the children, 71 per cent. of adult females, and 81 per cent. of adult males positive, and in villages of less than 500 the figures were 24, 69, and 74 per cent. respectively. More will be said later on the fallacy of drawing deductions as to cases from the tuberculin reaction. In East Africa the medical officer of health at Nairobi states that the increasing prevalence can only be described as a matter for grave alarm, and the medical officer of health at Mombasa that "the disease is widespread and appears to be increasing." In Dar-es-Salaam notification was made compulsory in 1923, and in the ensuing four years 7 Europeans, 36 Asiatics, and 135 African cases were notified. Many go unrecorded, for Dr. Wilcocks states that he saw cases, which would never have come to official notice, at the request of the sanitary inspector, and many of them were in an advanced stage. Also the disease was very virulent; 70 per cent. of those admitted to hospital died, and of these 60 per cent. died within a month of admission. In 1927, 17 per cent. of the certified deaths were due to tuberculosis and the death rate per thousand of the population was nearly three times that in England. Foley and Leblanc report that in Eastern Morocco 2 per cent. of the children and 11 per cent. of adults gave a positive reaction

in 1911-14; 8 per cent. children and 47 per cent. adults in 1923; 19·94 and 57·69 per cent. respectively in 1927, the increase being attributed to closer contact between natives and Europeans and to the development of alcoholism.

Tuberculosis among Europeans.

As regards the European in the tropics and his susceptibility evidence is not easy to obtain. It seems probable, however, that the white man whose conditions of environment have been such as to leave him but little exposed to infection occupies a place midway between the unimmunized native and the European at home, less susceptible than the former, more susceptible than the latter. It must not be assumed on that account that the European bears an "inherited resistance"; it is more probable that he possesses a higher power of acquiring resistance than has the native, a very different matter.

When comparing the white with the black races in this respect, other questions than mere susceptibility have to be considered. Thus, in Porto Rico the native and the white have been in close contact for nearly four centuries, and one might expect the negroes to be as immune as those of Spanish descent, but owing to the effect of the standard of living on the general health the native is more liable than the European stock or the Jamaican negro, while in their turn the whites have a mortality double that of whites in the United States. Callender and his co-workers in Manila investigated by means of physical examination and radiograms the prevalence of tuberculosis among 1,000 American (white) troops as compared with that in Filipinos. In the case of the former they found 10 per cent. at 19 years, 1·8 per cent. at 30-34 years, and a total of 7·3 per cent., decreasing as age advanced, probably owing to weeding out and discharge on detection. Among the latter the figures were 10·3 at 19 years, 20 at 30-34 years, 25·1 at 40 years, and a total of 17·7 per cent. Here, again, a most, perhaps *the* most, important factor is the mode of life, for the Filipinos have been exposed to tuberculization for a long time and their faulty hygiene favours infection. Among them the infantile and childhood mortality from this disease is high; those with greater powers of resistance survive till later years, when recrudescence occurs. This finds support in the fact that post-mortem examination reveals the tendency to fibrosis, and many of those recorded as "positive" were also stated to be "inactive."

The Causation of Tuberculosis in the Tropics.

The subject of the causes of the prevalence and spread of tuberculosis in the tropics is an intricate one, but may be summed up in a few words. First of all comes the introduction of the bacillus into "virgin

soil," a much abused and sometimes misunderstood term in regard to this disease (see later); thereafter, the mode of life, habits or change of habits, industrialism, overcrowding, and general want of hygiene foster its spread. Thus, amongst the Hindus the joint family system, early marriage, too frequent pregnancies, prolonged lactation, and crowding together make a formidable list of depressants. In India, until married, the young live mostly in the open air, and tuberculosis is not so common among girls. On marriage, they are pent up, have no exercise, very little air and less ventilation, and are exhausted by early pregnancy, unhealthy and insanitary parturition, and poor food. In Hong Kong, the children living in dark houses, amid unhealthy surroundings, receive infecting doses large and frequently repeated. The Karo-Bataks of Sumatra have, till less than a quarter of a century ago, lived much secluded, and tuberculosis was slight among them. Then came the consolidation of the Dutch occupation, and the custom of the people to live crowded together (eight families in a "house of one room," even if as large as 14 × 10 × 5 metres, is not ideal) and to mix with the Europeans in industry has resulted in a greatly increased incidence. The spitting habit, universal among natives, but probably reaching its highest development in the East, is a far from negligible factor. Ignorance of the elements of hygiene, or absence of any attempt to apply them, despite active propaganda, the dust bacillus-laden, the natives spitting freely not only out of doors but in their houses, and the habit not being regarded as in any way objectionable, under such conditions can a heavy incidence and high mortality among the young be wondered at? In large native communities near centres of industry carried on by Europeans tuberculosis becomes a very grave menace. The unceasing and increasing commerce and industry lead to greater and closer intermingling of the races. Those natives who acquire a massive infection die off rapidly, others return to their home villages carrying with them the virus which is destined to exercise its fatal effect in the family circle, which in turn becomes a fresh focus of dissemination.

Types of Tuberculosis.

One of the most interesting aspects of tuberculosis in the tropics, interesting to both the clinician and the pathologist, is the type of disease met with. The usual division into "natural" and "modified" disease does not adequately cover the field. There is a certain gap between the two for which the term "larval" has been applied. This is an expressive term happily coined by Professor Lyle Cummins to designate a stage in the development of the lesion when the organism may be scotched and possibly killed before it can work further mischief, or, on the contrary, may, under suitable conditions of environment,

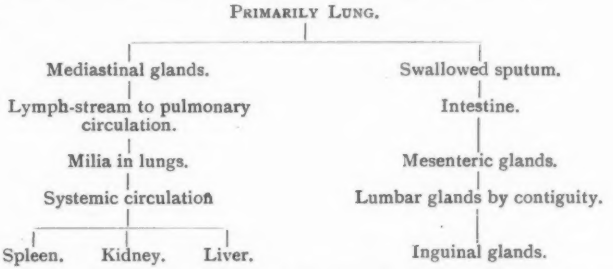
develop further and become a focus whence widespread havoc may start and lead perhaps to an issue fatal to its host.

Much has been written and more has been heard of the term "virgin soil" to account for the virulence of tuberculosis among native races in the tropics; the disease under such conditions is, as Borel described it, "La tuberculose de l'enfant, ou du singe, ou du cobaye." Everyone, strictly speaking, was virgin soil at one time, but other factors come into play to prevent the infection becoming the fulminating, acutely fatal disease such as we meet with sometimes in the tropics. When infection of the non-immunized takes place, the advance occurs in three not definitely separated stages. First, according to the portal of entry, we have the primary focus, usually, but not necessarily always, single. The lymphatic system provides the principal channel for the transference of tubercle bacilli to distant parts of the body in early cases in man (the same holds good in Primate animals), and by a study of the comparative pathology of the disease the order of glandular infection is found to be the same in human tuberculosis as in that of other Primates. The second stage, then, is adenitis of, it may be, the cervical, mesenteric, or tracheo-bronchial glands. Tubercle bacilli can pass through lymphatic glands, especially when they become enlarged and inflamed. Normal glands retain the bacilli, and the reaction set up in their so doing is evidenced by the formation of tubercles, and later by breaking down and caseation of the tissue. Under unfavourable conditions, among which must be included a massive infection, dissemination occurs, resulting in a caseous pneumonia or broncho-pneumonia, or a gland (or other focus) may open into a blood-vessel and general distribution result, when the lungs and other viscera will present large numbers of small tubercles. The serous membranes become characteristically affected; milia are found on the pleura, pericardium, peritoneum, meninges; the same or large aggregations of them may be seen over the spleen and liver, constituting a tuberculous perisplenitis and perihepatitis. The mesenteric glands, as already mentioned, may be caseated, discrete, or in conglomerate masses, and milia may be visible on the serous aspect of the intestine, though actual intestinal lesions are not common. This is "virgin soil" tuberculosis, and the chief negative characteristic is the absence of fibrous reaction or any attempt at delimitation of lesions. The following brief account of an actual post-mortem may be given to illustrate this:

A., male, aged 10 months. Cervical glands enlarged and caseous on both sides, more on the right than on the left. Lungs: In the lowest lobe of the right was a breaking-down area the size of a filbert, in the middle lobe a caseated focus as large as a pea, while miliary and grey tubercles were scattered throughout all three lobes. In the left lung was a caseated deposit the size of a walnut in the lower lobe, and

two, each as large as a haricot bean, in the upper, and, as in the right, grey tubercles throughout. Tubercles were present in the pleura—visceral, parietal, interlobar, and phrenic. All the groups of the mediastinal glands were enlarged and caseated. Early-stage ulcers were present in the intestine and small tubercles visible on the serous aspect. The glands of the upper mesenteric group were enlarged, caseated, but not adherent. Milia were present in the liver, the spleen contained rather more and somewhat larger tubercles. Aggregated small tubercles were present in the lower pole of the right kidney. The inguinal glands on each side were as large as cherries and caseated. The brain and meninges showed no tubercles in this case.

The course of events may be thus explained: Primary infection of lungs; thence involvement of the tracheo-bronchial glands and by the veins extension to the pulmonary circulation, leading to generalization in the lungs again, producing the milia which were present in all lobes, both lungs. Thence entrance was gained to the systemic circulation, causing lodgment in liver, spleen, and kidney. Again, the sputum being swallowed (children of this age have not acquired the spitting habit), the intestinal lesions would be produced and the consequent mesenteric tuberculous lymphadenitis. By direct contiguity the lumbar glands might become involved, whence would arise the inguinal glandular tuberculosis. For clarity, the adjoined diagram is inserted:



Passing on to the intermediate "larval" type, an analogous condition experimentally producible in animals may first be referred to. If tubercle bacilli are inoculated into the skin of animals not already infected, the rate of progress of the lesions is found to be considerably more rapid than in the case of animals previously infected which have thereby acquired the power of checking, or at least retarding, the extension. In a similar way, in persons with an antecedent subinfection the lesions tend to become latent or to run a more chronic course. In other words, if the infecting bacilli are few in number and not too frequently repeated, the patient can set his defence forces to work and a certain degree of resistance is acquired. He will naturally react positively to the von Pirquet test, although presenting no signs of actual disease. In the urban centres of Léopoldville and Boma a considerable

proportion of chronic cases is seen, while others afford examples of the very acute form, the "natural" type above. Some of these mildly infected cases return to their own territory, where they very probably infect others of their family and their fellow-tribesmen. Again, in Sierra Leone, tuberculosis among the natives was in former days very rare. Later, the Kru boys engaged themselves to serve on ships voyaging to England, infection was contracted, and on their return they constituted foci for the spread of the disease in their native haunts. If the man after his return is able to live at his ease, there is no reason why further progress should take place as regards his infection; it may be scotched. He is, however, far from safe, although presenting no signs of disease, except a positive tuberculin reaction indicative of infection sufficient to excite hypersensibility. His condition is one of unstable equilibrium. If force of circumstances or a desire to better his financial state now drives him to change again his pastoral open-air life for work in an industrial town, to expose himself to irritating particles—dust, metal, silica—to work under conditions the reverse of hygienic, overcrowding, bad ventilation, or even such stress as may result from some intercurrent respiratory infection—measles, whooping-cough, influenza, and so forth—the old focus may again light up and heavy auto-infection occur, or reinfection from without with a large dose, and acute disease resembling the natural type may result in early death. It is this tendency to pass back, as it were, from the stage when resistance is being built up to the generalized infection under stress that distinguishes this type from the chronic disease of Europeans. He is no longer "virgin soil," but the degree of resistance which he has acquired is insufficient to cope with untoward circumstances and he falls a victim. There is no need to give examples of this; records of the miners in South Africa, of the workers in the Belgian Congo, Paneth's account of the Karo-Bataks, may be mentioned in passing. Dr. Anderson, tuberculosis officer in Mauritius, records how the population of Creole descendants of African slaves crossed with French settlers after the French occupation in 1715, and how Indian immigrants, coming in since about 1844, now form a majority, while Chinese traders from Canton have been settling in the island during the last ten years. He found that the curves of age incidence of tuberculosis are closely similar in all three races, and in general resemble those of rural England. The disease is consequently endemic now and gradually changing in type, becoming modified to resemble that of industrialized populations.

In brief, tuberculosis, when contracted under the natural conditions of tribal life, may present clinically the benign type which is met with in school-children in Europe, giving rise to a positive tuberculin test, but rarely to excretion of bacilli in the sputum. If death occurs from

disease other than tuberculosis and an autopsy is performed, healed tubercles are not found; the type verges rather to the caseating than to the fibrous or even the fibro-caseous.

In a paper dealing with tuberculosis in the tropics it is needless to speak in any detail of the chronic, "modified," or "compensated" type of disease as seen in England and communities among which infection has persisted for a considerable length of time. In the native it may follow the "larval" stage, if repeated auto-inoculation takes place in small amounts or if the subject returns to his home and remains free from intercurrent disease or undue stress.

General Considerations.

Enough has been said to show that the von Pirquet reaction is a useful and an informative test, but we must be cautious not to read too much into it or to draw too great deductions from it. It is diagnostic of infection, and of infection only; a positive reaction is not a proof of active disease. Further, the degree of intensity of the reaction has no relation with the degree of acquired resistance. Generally speaking, a high percentage of positive reactions is found where a relatively chronic type of the disease prevails. As Professor Lyle Cummins has pointed out, this does not necessarily mean adequate powers of resistance. In the case of the native, to particularize, it may mean merely that he has sufficient resistance to protect him under conditions of ease at home, but not under stress at work. For this there must also be neutralizing factors and a capability of responding rapidly by reaction on the part of tissue cells to limit and hold infective foci in check by forming a barrier which in time becomes fibrous, the centre ceasing to be active and perhaps cretifying. Such are seen in Europeans at home. Otherwise, as in the native, the process penetrates into the tissues, the lesions spread, and may at any time become disseminated, or reinfection, if in a dose sufficient to establish itself, may reactivate a focus which in the absence of such a stimulus might have remained latent.

The point may be raised that in the present article pulmonary tuberculosis only has been considered. All who have studied the disease in the tropics must have been struck by the rarity of other forms, and in particular the so-called "surgical tuberculosis." Intestinal affection is in the vast majority of instances a complication of pulmonary disease. One concrete example will suffice, for a similar tale is told in nearly all colonies. In the Federated Malay States Report appears this statement: "Non-pulmonary tuberculosis is exceedingly rare; of 2,571 cases of tuberculosis treated in Government hospitals, there was not one entry of disease of the bones and joints." This is easily understood in dealing with natives susceptible to infection and liable to severe forms of the disease rapidly progressive in character, for death occurs

early from pulmonary and generalized tuberculosis before joint or bone lesions have had time to develop. It is true that Beyers, when writing of disease among the Bantu races, found surgical tuberculosis comparatively frequently, but this was chiefly cervical adenitis.

Want of space forbids our referring to the prevalence of bovine tuberculosis in the tropics, except to state the general consensus of opinion as to its rarity.

We cannot conclude without a brief reference to the question of the tropics as a health resort for Europeans already infected. The idea of its efficacy probably had a twofold origin. First, that absence of the disease among primitive races was due to immunity the result of climatic conditions, and, secondly, that exposure to the sun's rays will kill the bacillus. The former has been demonstrated to be entirely false; the primitive races are not immune, but highly susceptible, and absence of the disease is due to non-introduction of the causative organism. As regards the second, it is true that direct sunlight will soon destroy the bacillus, but direct sunlight does not penetrate to a focus in the lungs; in warm and sunny climates there are greater facilities for exercise in the open air, but there is little doubt that sojourn in the tropics is not conducive to the full enjoyment of vigorous health even of the non-tuberculous; while the tuberculous subject is easily fatigued, he avoids the tropical sun, his rooms are shut and shaded in order that they may be kept cool; he suffers from loss of sleep, his appetite is capricious, and food less nutritious than at home.

Apart from these, the irksomeness of travel, the general discomfort, the lowering of mental and physical energy, and the liability to infections such as enteric fever, dysentery, helminthic parasites, and so forth, all militate against recovery. Many physicians, therefore, especially those with tropical experience, regard it as unjustifiable to send a European to a tropical climate with a hope of his improving, still less of recovering from, his tuberculous condition. Many, of course, do improve, but we must not pay undue attention to exceptions and ignore the rule. Rhodesia for years has been looked upon as a haven of refuge for the phthisical, yet the last official report contains the following: "Pulmonary tuberculosis is increasing in incidence both in Europeans and in non-Europeans. Phthisis in European immigrants is still too common, in spite of a tightening-up of our immigration laws, which forbid their entry except under specified conditions, and then only non-active cases. Why Southern Rhodesia should be considered a health resort for persons affected with this disease it is hard to fathom, for, in actual fact, under present-day conditions the very opposite is the case."

Even if the reverse held good, can we complacently regard the

question merely from the one-sided view of the European patient? Is it not an intensely selfish act to introduce open tuberculous cases amongst unprotected or partially protected natives, with the sole aim, which may not be realized, of self-cure? It is fundamentally a negation of British policy; in undertaking responsibility for vast populations of primitive races and bringing to their aid our civilization and our scientific knowledge we ought to avoid, as far as we can, the wilful introduction of our chief scourge—tuberculosis. To quote once again from Professor Lyle Cummins: "We are rather blind to the tragedies that our civilization has already left behind it, tragedies which are quite unvocal, but which have sometimes been very terrible." Part of our duty in bearing the white man's burden is to relieve some of that which we have ourselves imposed, and to conserve the health of natives who are brought into association with us in the course of industrial, educational, and other developments.

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THE PROBLEM OF TUBERCULOSIS IN INDIA.

By C. MUTHU,
M.D.,
Consulting Physician Mendip Hills and Thambaram Sanatoria.

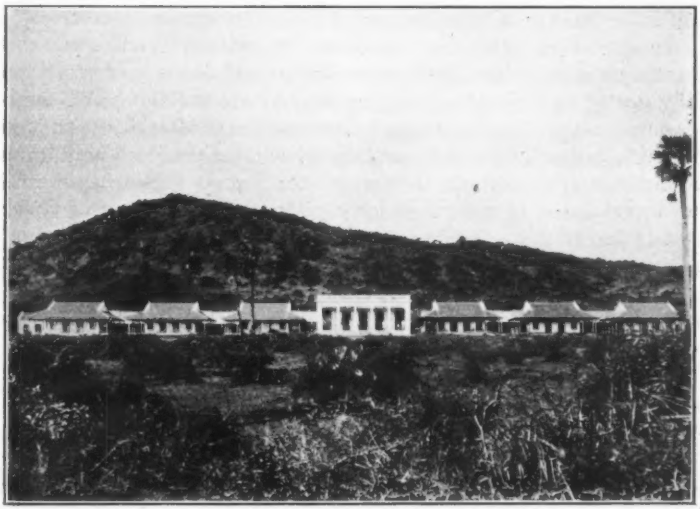
The widespread prevalence of tuberculosis among the many millions of Indians presents a grave and formidable problem in that country and demands the earnest attention of both the Government of India and the Indian people. As I have already surveyed this question in this journal,[1] I shall only point out here that only excepting malaria tuberculosis is the greatest scourge in India, devastating on its onward march many thousands of lives every year.

The Health Committee appointed by the Madras Government in 1926 reported that "respiratory diseases have steadily and rapidly increased during the last twenty years," and that "tuberculosis is rapidly increasing in Madras and is now a serious menace to the population." Reports from other parts of India tell a similar tale of the extensive ravages caused by tuberculous disease. The impact of Western civilization and the consequent changes in the social, economic, and industrial environment, and especially in regard to food, clothing and general manner of living, poverty and chronic underfeeding of millions of working and middle classes, overcrowding in towns and industrial centres, bad insanitary conditions, ignorance of the very elementary principles of hygiene, form some of the main causes of this widespread distribution of tuberculosis. Besides the social evils of the day such as child marriage, the purdah system, which confines many women, especially Mohammedan women, indoors in ill-ventilated and insanitary surroundings, intermarriage within the caste has also undermined the vitality of the people and opened the door to tuberculosis. Tuberculosis in India generally runs an acute course and ends fatally within a few months when the body resistance is weak; but when resistance is good, here and there, it pursues a chronic course, as in this country. In many cases, and especially in children and in adolescence, there may for months be nothing more noticeable than enlarged glands of the neck and periodic attacks of fever before physical signs in the lungs show themselves. I was surprised to find that many patients with quiescent pulmonary disease go about and do their daily work in Nepal, where the people for the most part live a primitive but outdoor life and eat the natural foods of the earth. Want of space

[1] Muthu, C.: "Some Impressions of Tuberculosis Problems in India," British Journal of Tuberculosis, July, 1923, vol. xvii., No. 3, p. 118.

prevents the writer at the present time from going more fully into the clinical and epidemiological aspect of tuberculosis as seen in India.

When we come to discuss a practical scheme of treatment and prevention of tuberculosis for 320 millions of the Indian people, consisting as they do of many races and tongues, we find ourselves confronted with a gigantic problem. For one thing, it is not advisable to adopt in India in any wholesale fashion the methods employed in dealing with tuberculosis in England, first because it is coming to be recognized that these measures are mainly devoted to the treatment of more or less advanced cases, and that they have not produced results com-



THE THAMBARAM SANATORIUM, INDIA.

The photograph shows three wards situated on each side of the administrative building.

mensurate with the amount of money spent on them; and secondly because Indian conditions require remedial and ameliorative measures more suitable to the environment, habits, and temperament of the people.

In the first place, social, economic, and sanitary reforms are urgently needed to raise the standard of health and efficiency of the people; these would greatly help in reducing the incidence and mortality from tuberculosis. I have already pointed out in my book on tuberculosis[1] that for successful warfare against the disease we should concentrate

[1] Muthu, C.: "Pulmonary Tuberculosis: its Etiology and Treatment." London: Baillière, Tindall and Cox, 1927.

our efforts on two main lines: early recognition and early treatment in adults, and the treatment and prevention of the disease in children. I have found both in England and in India that tuberculosis is more easily curable in children than in adults, especially if they are taken in hand during the pretuberculous stage and when presenting early symptoms and such troubles as enlarged glands of the neck, adenoids, lassitude and tired feeling, loss of weight, cough, periodical rise of temperature, etc.—all of which are more or less symptoms of disturbed nutrition or established malnutrition. Under fresh air, good feeding, wholesome surroundings in the country or the seaside these cases do well, as proved by the Grancher system when carried out in France, and as has been done in a small way in this country.

In spite of many adverse criticisms, the sanatorium still offers the best means and the best place where children and adults can be successfully treated under ideal open-air conditions. According to Sir George Newman, of the Ministry of Health, there are 494 residential institutions, hospitals, and sanatoria in Great Britain, whereas there are only three or four sanatoria worthy of the name in the Madras Presidency, which has a population of more than forty millions, equal to that of Great Britain and Ireland. There are only seventeen or eighteen homes and sanatoria for the whole of India, with its 320 millions of people. Thus it can be seen that the need for open-air sanatoria in India is indeed very great and urgent.

But the usefulness of the sanatoria has its limitations. It cannot itself solve the tuberculosis problem unless it forms a part of a wider and more comprehensive scheme where it would become the centre of many activities. Hence a garden colony to which a sanatorium is attached offers the best hope of success in the treatment and prevention of tuberculosis in India. For here in the garden settlement there would be a sanatorium for early cases. In another part houses or bungalows would be reserved for those suspected or threatened with tuberculosis. Still in another part children of tuberculous parents or those in the pretuberculous stage would be looked after and placed under the best hygienic conditions and provided with an open-air school. In another place convalescent or ex-patients would be accommodated with their families and be kept under medical supervision, and, if necessary, trained in some outdoor occupation. A public hall would be found useful for propaganda work, for giving lectures on hygiene and health subjects, and as a place of recreation and entertainment. A dairy farm with cows kept under ideal sanitary conditions would complete the equipment of the garden colony, whose grounds would be laid out with spacious walks and broad avenues, so as to give the picturesque appearance of a health resort.

With such aims in view the writer recently went out to India, and

after acquiring from the Madras Government some 250 acres of land at Thambaram, situated a few miles from Madras on the slope of the hills, laid out the estate as a garden colony and built on one side a tuberculosis sanatorium, which was opened in April, 1928, by the Right Hon. V. S. Srinivasa Sastry, P.C. Only half the sanatorium, with three wards on each side of the administrative building, quarters for medical officers and nurses, has been built so far and occupied. Each ward has two rooms with verandahs for two patients. When complete there will be six wards for men and six wards for women, besides administrative offices, quarters for visitors, for post-graduate course, etc. But the whole scheme is too big for a private individual to undertake alone, however enthusiastic he may be. Lack of financial help from the Government and the Indian public has prevented the writer from putting into operation the full programme as sketched out in the above plan. After thirty years of sanatorium experience both in England and India he is convinced that such a garden settlement opened in each of the Presidency capitals at first and extended to other parts would go a long way to solve the immense problem of tuberculosis in India.

THE DISPENSARY TREATMENT OF TUBERCULOSIS.

By A. P. FORD,

M.R.C.S., L.R.C.P., D.P.H.

Tuberculosis Officer, Deputy Medical Officer and School Medical Officer for the County of Hertfordshire.

When discussing the rôle of the dispensary in a tuberculosis scheme it is always necessary to remember that the primary object of all such schemes is to prevent the spread of tuberculosis, and that consequently much of the time of the Tuberculosis Officer must be occupied in the examination of doubtful cases and, as far as possible, of all contacts. These examinations, however, are by no means the only duties to be performed by the Tuberculosis Officer. If a scheme for dealing with tuberculous cases is to be successful it is essential that all patients suffering from the disease should be kept under constant supervision, and that over a considerable period of time. No matter how conscientious both the patient and the physician may be, it very frequently occurs that unless some form of treatment is also given the patient begins to lose his enthusiasm and ceases to attend at the dispensary. It is therefore necessary that, viewed from the point of view of prevention,

some form of treatment should be provided. This treatment should be much more than merely prescribing cod-liver oil or a creosote mixture.

If the dispensary is to maintain its proper place in our tuberculosis scheme, the treatment provided should, whenever possible, be some special form of treatment that the patient cannot readily obtain from his general practitioner. There are many such special forms of treatment which can be carried out at the dispensary. At the moment the three most common are treatment (1) by tuberculin, (2) by the maintenance of an artificial pneumothorax, and (3) by the administration of sanocrysin. The two latter measures must, of necessity, be commenced in an institution, and it is also often advisable that a patient commencing tuberculin treatment should have the first few doses given in an institution unless the home conditions are particularly favourable. In the carrying out of an artificial pneumothorax and in the administration of tuberculin it is very rarely possible for the patient to remain in a sanatorium for a sufficiently long period to complete the course of treatment and so, by continuing these forms of treatment at the dispensary, they frequently become available to patients who otherwise would not be able to have them.

With regard to the use of sanocrysin, although it is essential for the patient to remain in an institution until the first course of the treatment is concluded, it is frequently possible to prevent relapse by giving further minute doses at the dispensary at intervals of from four to six weeks. In carrying on this form of treatment, however, arrangements must be made for the urine to be examined for the presence of albumin for a few days before and after the dose is given.

Tuberculin treatment must be considered a great asset to the Tuberculosis Officer at the dispensary. Although the results are rarely dramatic, marked improvement is frequently obtained, particularly with children suffering from tuberculosis of the cervical, tracheobronchial, or mesenteric glands. In order to carry out this treatment the patient must be provided with a thermometer and chart and be taught to keep a careful record of his or her own temperature. It is surprising how easily even children can learn to do this. The various tuberculins should be carried in separate bottles in dilutions of 1-10, 1-100, 1-1,000 and 1-10,000, so that by means of a small pipette an accurate dose can be made for each patient. Apart from the specific results obtained, the patients having tuberculin treatment always appear to be so much happier than others. They feel that something is being done for them, whereas after a few months of medicinal treatment consumptives and other tuberculous subjects are liable to become despondent.

Artificial pneumothorax refills can quite easily be given at the dispensary, provided there is a couch available on which the patient

can rest after the refill, and that arrangements can be made for an occasional X-ray examination. Most forms of apparatus — *e.g.*, Lillingston's and Vere Pearson's—can be carried by car from one dispensary to another without fear of breakage.

By the foregoing remarks it is not suggested that dispensary treatment can take the place of treatment at the sanatorium, but rather that dispensary treatment should be regarded as an adjunct to sanatorium treatment. Even the earliest case of tuberculosis requires, on an average, two years of active treatment before it can be considered quiescent; and it is only in very rare cases that patients are able to remain in an institution for the whole of such a long period. By arranging to continue special forms of treatment after the patient has left the sanatorium it is frequently possible to prevent that "bugbear" of all tuberculosis workers—namely, the "return case."

On the other hand, it must not be forgotten that dispensary treatment is only applicable to ambulatory cases. Rest is the first essential of all forms of treatment of tuberculosis, and if a patient who should be at rest is encouraged to attend the dispensary in order to obtain some special form of treatment then only harm can result.

A TUBERCULOSIS MUSEUM.

By S. H. DAUKES,

O.B.E., M.D., D.P.H.,

Director, Wellcome Museum of Medical Science, 33, Gordon Street, London, W.C. 1; Author of "The Medical Museum: Modern Development, Organization, and Technical Methods based on a New System of Visual Teaching."

The functions of a medical museum are many, and, during recent years, the acknowledged need for instruction of the public has increased the educational scope of such museums. It is possible to classify these functions under seven heads: (1) Collection of material; (2) preservation of material; (3) identification of specimens; (4) classification and description; (5) demonstration and display (specific teaching); (6) research; (7) propaganda (popular education).

The relative importance of these various objects must naturally depend upon the type of student for whom the museum has been established. Three groups will be especially interested in a museum dealing with the subject of tuberculosis: (1) The tuberculosis expert, whether engaged in clinical or preventive work; (2) the general practitioner; (3) those members of the general public who take a practical interest in preventive medicine or are personally concerned with the disease in their homes.

It is obvious that each of these groups will demand a different type

of exhibition. *The expert* will be mainly concerned with the research side of the museum, either from a pathological or statistical standpoint; his interest will extend to the manifestations of this disease throughout the animal kingdom, and more especially to the effect of climate, race, and occupation upon its incidence in the human species. *The layman*, on the other hand, will demand a simple summary of the lessons which may be learned from such investigations in as far as they bear upon the question of prevention and treatment. He is intimately concerned with the social and economic effects of the disease. *The practitioner* occupies an intermediate position; he needs to revise his knowledge and to be informed of any fresh developments, more especially with regard to diagnosis, prevention, and treatment.

It is obvious, if our hypothetical museum is to be of value to all three groups, that some means must be discovered which will admit of the simplification required by the layman and also of the amplification demanded by the expert. The needs of the general practitioner might be regarded as a suitable basis upon which to work; provision being made for amplification in the pathological and statistical sections, and for a more graphic and popular system in the ætiological and statistical sections. It is with causation, prevention, and progress that the general public is mainly concerned; they do not wish to be harrowed with bottled specimens of human remains. For this reason it is convenient to divide any medical museum, intended for general use, into two sections—one dealing with ætiology, prevention, and statistics; the other with pathology, symptomatology, and treatment.

In the first of these sections special attention would be paid to propaganda work and popular education, and considerable latitude should be allowed with regard to the method of demonstration—models, pictures, and illuminated devices could be freely used. In the other section the needs of the expert would have to be considered, more especially with regard to pathological material. It is essential to differentiate between exhibition specimens and research specimens. The former must be arranged so as to form a consecutive demonstration of carefully mounted specimens, labelled with due consideration for the possible limitations of those who visit the museum. The reserve specimens, on the other hand, must be carefully catalogued, labelled, and stored. They must be well preserved and kept in jars which enable them to be readily handled for purposes of research. They may be stored on shelves or in cupboards placed in relationship to the portion of the exhibit to which they belong. Where space is available a separate room should be set aside for study and research, in which additional space may be provided for such specimens.

In the ætiological section will be shown paintings and specimens which illustrate the factors responsible for disease either directly or

indirectly. Photographs of the organism may be shown, together with typical cultures; methods of infection and predisposing factors—knife-grinding, tin-mining, malnutrition, alcohol, overcrowding and infectious diseases—may be demonstrated by means of paintings or models. The various prophylactic measures form a natural corollary to such a demonstration: these would include methods of ventilation, housing and town-planning, the use of ultra-violet rays, dietetic instructions, trade precautions against lung irritation, propaganda work, and advice with regard to the predisposing causes during childhood. There might also be included an exhibition of posters used in various countries to instruct the public. The value of early diagnosis and treatment, as a preventive measure, should be emphasized.

The pathological section should show the microscopical as well as the macroscopical changes. The former may be demonstrated by means of drawings and photomicrographs—colour photomicrographs viewed in a specially designed illuminated box are of great value. Specimens should be mounted as wet or dry preparations illustrating all the gross lesions commonly met with in the disease both in man and in the domestic animals. In this section only typical specimens should be shown. As far as possible, all the lesions from one case should be demonstrated together. Following this would be a series of exhibits, classified anatomically, showing the disease as it affects the various organs. Lastly would be shown specimens illustrating the experimental work carried out with animals.

In proximity to the specimens, on walls and screens, should be pictures, radiographs, and temperature charts, illustrating the clinical features associated with each morbid process. On separate screens may be placed the illustrations of clinical conditions which do not provide material for specimens—such as lupus vulgaris.

In the section dealing with treatment will be shown pictures of sanatoria, dispensaries, tuberculosis colonies and workshops, orthopædic centres, apparatus for surgical or light treatment, drugs, and appliances of every kind. An exhibit should also be included illustrating the preparation of tuberculin and its uses. Photographs of cases *before* and *after* treatment are of value, more especially those showing the effects of combined orthopædic and sunlight therapy. In association with lupus the effect of light treatment may be effectively demonstrated.

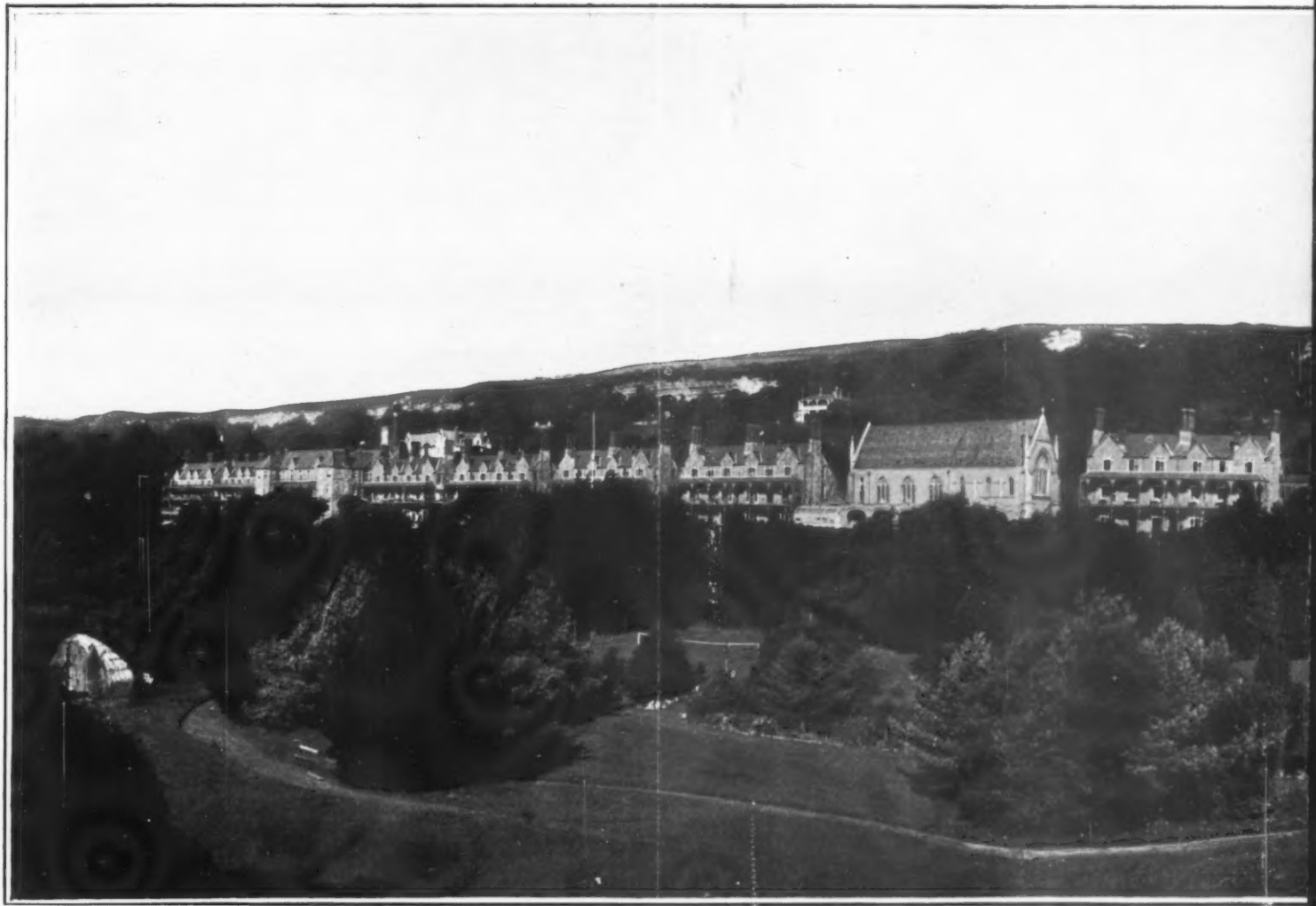
The whole tuberculosis exhibition should be linked up with carefully written summaries, accurate descriptive labels, and a file containing cuttings on the subject of recent work. As soon as any piece of new work has been established, it should be included in the general exhibition by means of models, illustrations, or specimens. A museum arranged on these lines would be a comprehensive one, and would appeal to all who are interested in the problems of tuberculosis.

ASSOCIATIONS AND INSTITUTIONS.

THE VENTNOR HOSPITAL.[1]

THE Royal National Hospital for Consumption was founded at Ventnor, in the Isle of Wight, by Dr. Arthur Hill Hassall in the year 1867. In the *Lancet* of June 22 of that year appeared these words: "There are few spots, if any, in the British Isles more highly favoured than is the Undercliff . . . the beauty of its scenery and fertility of its soil have led to its receiving the appellation of 'The Garden of England'"; and after referring to the proposal of Dr. Hassall to build a hospital for consumption and diseases of the chest in this district, the *Lancet* continued: "This undertaking is one not merely of local but even of national importance." How true this statement was is shown by the recorded number of patients at the end of 1928, by which time 35,320 sufferers had been received from every county in the British Isles. At the beginning of November, 1868, the first block of houses was opened for the reception of twelve patients. Of these, seven came from London, and one each from Scotland, Wales, Berkshire, Kent, and Warwickshire. Thirty years later, in 1898, H.R.H. The Princess Beatrice opened the eleventh block of houses, completing, with the chapel, about a quarter of a mile of buildings. From east to west the hospital is connected by a subway for use in bad weather. The institution was a pioneer of the "open-air" system of treatment, and a much appreciated feature of the buildings is the provision of separate bedrooms for patients. Adjoining the bedrooms are balconies and verandahs, all situated on the south side, affording exquisite views of the gardens and grounds, comprising twenty acres, and the broad expanse of the English Channel. The chapel of St. Luke, standing between blocks five and six, was erected by a special fund subscribed for that purpose, and is excellently furnished, being one of the best chapels of its kind in the kingdom. Wireless is installed throughout the hospital, and microphones placed in the chapel permit services and organ recitals to be broadcast to patients confined to bed. The chapel and eleven houses complete the original design of the founder, but with the advance of medical and surgical knowledge bearing upon the treatment of tuberculosis it was found necessary to equip an X-ray department and provide an operating theatre. In addition to the ordinary sanatorium routine, modern methods of treatment are used in suitable cases. Artificial pneumothorax is being largely practised, and Professor Mollgaard's sanocrysin (known more familiarly as the "gold treatment") is employed in carefully selected cases. The administra-

[1] The description of the Ventnor Hospital here presented has been prepared at the suggestion of the Editor by the Secretary, Mr. W. H. Garratt, and the Medical Superintendent. A copy of the Annual Report and further particulars may be obtained on application to the London offices of the Royal National Hospital for Consumption and Diseases of the Chest, 18, Buckingham Street, Strand, W.C. 2. A general view of the Ventnor Hospital is shown in the accompanying illustration, prepared from a block kindly lent by the hospital authorities.—EDITOR *B.J.T.*

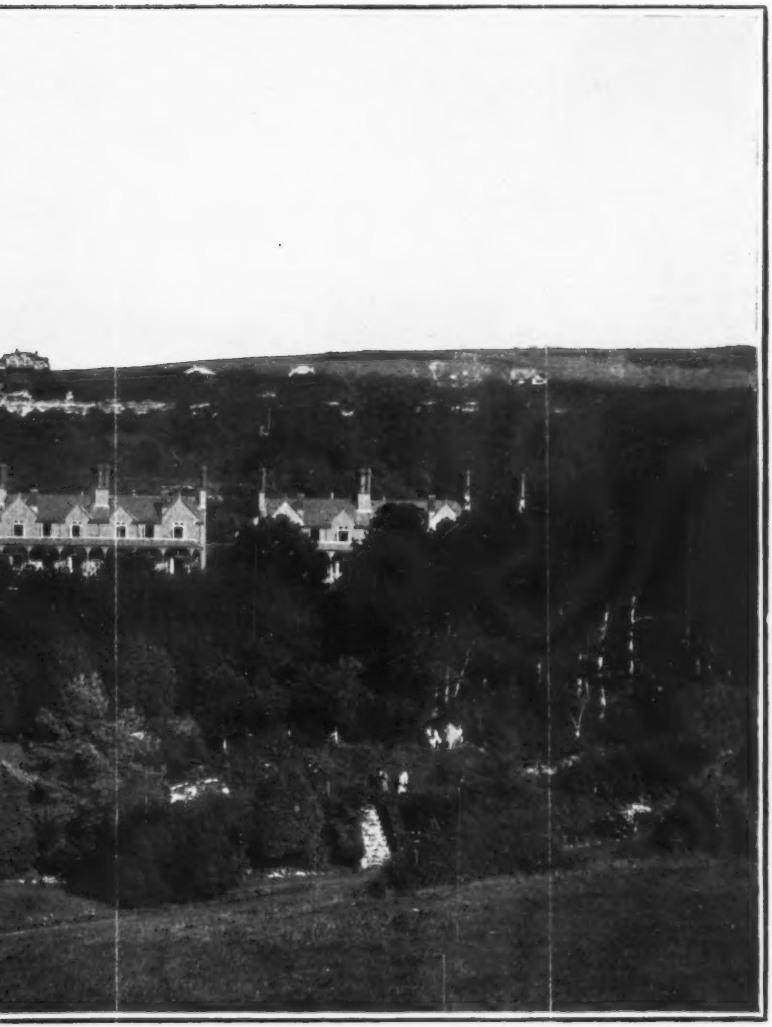


THE ROYAL NATIONAL HOSPITAL FOR CONSUMPTION.

General view, indicating the eleven houses and, in the centre, the chapel of St. Luke. The view is taken from the sea, and shows the protecting down

THE ROYAL NATIONAL HOSPITAL FOR CONSUMPTION.

he chapel of St. Luke. The view is taken from the sea, and shows the protecting downs on the north



on the north and the sheltering trees and shrubberies on the south.

[*To face p.* 198.

tion of sanocrysin is being thoroughly tested, and such encouraging results have been obtained that it is hoped this new agent may ultimately be generally approved in suitable cases. The hospital is fortunate in having on its consulting staff many eminent physicians actively concerned with the diagnosis and treatment of tuberculosis; on the surgical side specialists' advice and skill are at the service of the patients. One consulting physician visits the hospital from London every month, and members of the surgical staff visit periodically as may be required. Whilst the hospital can justly claim to provide a medical and surgical service and equipment of the highest order, it must be remembered that the climatic conditions of the Undercliff contribute a great deal towards the attainment of the very successful results. The amount of sunshine enjoyed is greater than in most other British health stations. In 1928 Ventnor recorded 2,010 hours of sunshine, and for comparison it may be noted that Kew recorded 1,648 hours; Liverpool, 1,440 hours; and Aberdeen, 1,227 hours. Professor Leonard Hill has shown that Ventnor has a much greater proportion of ultra-violet rays per hour of sunshine than any other English resort. Indeed, in this respect Ventnor compares not unfavourably with many Swiss centres. Under the will of the late Mr. Thomas Lampard Green, his trustees were able in 1924 to undertake the provision of a nurses' home. The site is immediately to the north of the main buildings, and a tunnel under the roadway connects the home with the hospital. A fund was raised for furnishing and equipment, so that when H.R.H. the Prince of Wales opened the building in 1926 he was able to declare it free of debt. At the present time the Board are engaged upon a task of some magnitude. The steam and heating plant, installed many years ago, is now considered inadequate to meet the requirements of the hospital, and the improvements outlined include a complete transformation of the engine-room, new mains, storage tanks, and perhaps a plant for generating electricity. As soon as this work is completed and paid for, it is hoped it may be possible to develop a site of about six acres opposite the hospital, and although the details have not been settled, the idea is to make use of natural sunlight and ultra-violet rays for the treatment of children who are suffering from pulmonary or surgical tuberculosis. There is scope for much useful work in this direction, and accommodation for such cases is very greatly needed. The proposed undertaking will involve a considerable financial outlay, and affords an opportunity for someone of large vision and means to harness for all time the curative properties of light and climate for the benefit of small sufferers from tuberculosis. It will be of interest to refer to the extremely low charges made to patients. For those who have a Governor's letter of recommendation the weekly payment is only thirty shillings. Without a letter the fee is three guineas a week. Arrangements are also undertaken in special circumstances whereby County Councils may bear the financial responsibility. The fees include special methods of treatment, X-ray investigations, and all charges with the exception of personal laundry and travelling expenses. The facilities of the hospital are therefore within the reach of that large body of sufferers for whom the State does not provide, and who cannot afford treatment at one of the more-or-less expensive private sanatoria. The hospital has already benefited thousands, who have gone forth with renewed health to take

their part in the workaday world. These patients have been taught to take care of themselves and how to avoid risk of infecting others. Letters from old patients expressing warm gratitude reach the staff continually, and in cases where breakdown has occurred after discharge patients and relatives will not be content until efforts have been made to gain readmission. So in the faith of its patients, the hope of its staff, and the charity of its founder and supporters, there seems to be but little doubt that the institution will still continue to progress and prosper.

The National Association for the Prevention of Tuberculosis, the headquarters of which are at 1, Gordon Square, W.C. 1, has issued in handsome illustrated form and with a fine portrait of the Prince of Wales, President of the Association, as frontispiece, the thirteenth report, containing records of the activities of the past year, and reporting on the Fourteenth Annual Conference in London last October and the visit of Canadian tuberculosis officers. In an Appendix is an account of the Special Educational Campaign of the Association.

The London School of Hygiene and Tropical Medicine, situated in Keppel Street and Gower Street, Bloomsbury, established by the munificent generosity of the Rockefeller Foundation and incorporated by Royal Charter, was opened by the Prince of Wales on July 18. This great institute of preventive medicine is to be devoted to post-graduate teaching and research work, and will be open to students of all nations. Courses for the Diplomas in Public Health, Bacteriology and Tropical Medicine and Hygiene are now commencing.

The Tuberculosis Village Settlement at Papworth in Cambridgeshire was visited for the second time by the Duke and Duchess of York on July 23. The Duke said Papworth was famous abroad, and there was hardly a country which has not sent qualified representatives to study Papworth's methods. *The Times* for July 23 devoted a leader to the work of the Papworth Village Settlement for Consumptives, and in which appears the following: "The new Minister of Health has an opportunity to reorganize the care of tuberculosis in the light of this experiment, for the time has arrived when reorganization must be undertaken." The Settlement has been in existence for twelve years, and is now a community of 700 persons. Although 160 children have been born of parents one of whom is tuberculous, no trace of the disease has been detected in anyone. The Papworth industries in 1918 had a turnover of only a few hundred pounds, while in 1928 it reached £54,000, and men and women who, without the opportunities of the Settlement, would be unemployable have received £112,000 in wages.

The Metropolitan Life Insurance Company, Madison Square, New York, issue a magnificent series of illustrated educational booklets and other publications for distribution to their policy holders and others which deserves to be known to medical officers of health and other workers for health and happiness throughout the British Empire.

The series contains a striking, artistic, informing pamphlet on tuberculosis, which we specially commend to the notice of tuberculosis officers in this country. In the "Health Heroes" series is a popular sketch of the great tuberculosis pioneer, Edward Livingstone Trudeau. The British office is at Bush House, Aldwych, W.C. 2.

The services and publications of the Rural Industries Bureau, the headquarters of which are at 27, Bedford Square, W.C. 1, should be known to all lovers of the countryside and those who are privileged to live and work under rural conditions. We would particularly commend to the notice of tuberculosis officers and others interested in the development of occupation therapy in sanatoria and settlements or among patients under domiciliary treatment the admirable series of pamphlets published by the Bureau. We have recently received copies of the following: No. 7, "Hand Spinning and Weaving"; No. 16, "Rush Work"; No. 19, "Hints to Homeworkers"; No. 20, "Leather Work."

The forty-fourth Annual Medical Report of the Trudeau Sanatorium and the twenty-fourth Medical Supplement, together with the Twelfth Collection of Studies of the Edward L. Trudeau Foundation for Research and Teaching in Tuberculosis, is a 257-page publication of exceptional interest, containing as it does communications on B.C.G., "Filtrable Forms" of the Tubercle Bacillus, the Isolation of the Tubercle Bacillus from Sputum, Immunological Studies in Tuberculosis, and other suggestive matter.

The Directors of the Milbank Memorial Fund, 49, Wall Street, New York, have published their Annual Report for 1928, giving particulars of services in connection with three New York Health Demonstrations and other health; educational, and research projects. The volume affords fine evidence of scientifically directed philanthropy in the prevention and arrest of tuberculosis and other diseases, and the maintenance of health and happiness.

The National Association for the Prevention of Tuberculosis, 1, Gordon Square, W.C. 1, has reprinted as a 7-page pamphlet Sir Robert Philip's address on "The Principles Underlying a Scheme of Anti-Tuberculosis Measures in any County" from the Transactions of the Fourteenth Annual Conference of the N.A.P.T.

The Seaman's Hospital Society has issued the Medical Superintendent's Report for 1928 of King George's Sanatorium for Sailors, Bramshott Place, Liphook, Hants. Dr. J. E. Wood provides an analytical study of 101 cases.

The Society for the Prevention and Cure of Consumption in the County of Durham has just issued its thirtieth Annual Report, containing particulars of the work of the Stanhope Sanatorium for men and

boys and the Leazes House Sanatorium for women and children at Wolsingham. A copy of the report can be obtained on application to the Secretary, Mr. Fred Forrest, 54, John Street, Sunderland.

The Tuberculosis Section of the Metropolitan Asylums Board Annual Report for 1928-29, issued from the offices of the Board, Victoria Embankment, E.C. 4, in July, 1929, contains Tuberculosis Institutions' Statistical Tables and Reports by Medical Officers of the M.A.B. Tuberculosis Service.

The Lord Mayor will preside at the coming-of-age festival dinner of the Treloar Cripples' Hospital at the Mansion House on Tuesday, October 22. The hospital, founded by Sir William Treloar when Lord Mayor in 1906-07, was opened in September, 1908. It was designed to accommodate 200 patients, whereas today at Alton and the seaside branch at Hayling Island 405 crippled children, many being tuberculous, are receiving treatment, education, and training. The ward buildings at Alton are the wooden structures remaining from the Princess Louise Military Hospital, provided for wounded troops from the South African War. The cost of repair and upkeep has now reached a figure beyond the interest on estimated capital outlay for rebuilding, and the trustees have decided that rebuilding is not only the most economical proposition, but will be the best means of adapting the institution to render service to the community. Rebuilding will cost £100,000, and will be undertaken as finances allow and without the closing of a single bed at present in use. The Mansion House dinner will inaugurate an appeal to be made by Lord Burnham, a trustee of the hospital, for the rebuilding fund. The other trustees are: The Bishop of London, Miss Florence Treloar, the Lord Mayor, Lieutenant-Colonel Frederick Lawson, and Mr. T. J. Harrowing. The medical superintendent is Sir Henry Gauvain. The offices of the fund, of which Mr. H. B. Harper is the secretary, are at 25, Ely Place, Holborn, E.C. 1.

The Sun Life Assurance Company of Canada are providing fifty scholarships of £100 each to enable British tuberculosis workers to visit Canada and the United States in August and September, 1930, at the time of the British Medical Association meeting in Winnipeg. All arrangements are in the hands of the Joint Tuberculosis Council, of which Dr. Ernest Ward, 123, Torquay Road, Paignton, is Secretary.

The Council of Stoke-on-Trent propose to purchase for service as a tuberculosis hospital Wootton Hall, situated on the Staffordshire bank of the River Dove, and which was in 1766 the home of Rousseau.

NOTICES OF BOOKS.

PULMONARY AUSCULTATION.

Dr. H. Jumon has prepared a little monograph the object of which is to bring the teaching of Laennec into line with recent advances in pathology and radiology.[1] Those interested in the physics of sound conduction through the lung and chest wall will find the subject treated clearly and concisely. The author in a particularly lucid description indicates the way in which the sound made by the passage of air through the stricture formed by the glottis is conducted to the surface, where it gives rise to those alterations in the breath sounds which have been somewhat loosely named bronchial, tubular, and amphoric. Adventitious sounds also receive careful attention, and the varieties met with in various pulmonary conditions are dealt with in a manner which makes one appreciate the clearness of French prose in a description demanding accuracy combined with brevity. The book concludes with a recommendation that medical examiners should only be guided by definite and clearly demonstrable signs; more dubious ones should be noted and searched for again, but not hastily pushed into a classification which may prove false.

Andrew Morland, M.B.

HUMAN TUBERCULOSIS OF BOVINE ORIGIN.

A clear and comprehensive study of the problem of bovine tuberculosis in relation to human tuberculosis is presented by Dr. Savage, County Medical Officer of Health for Somerset, in his recent monograph on the subject.[2] The aim of the work is well expressed in the preface, which states that the account is written with the hope that it will provide a clear and accurate picture of the present position of this side of the tuberculosis problem and enable attention to be focussed upon lines of prevention which are likely to yield good results. Dr. Savage treats his subject in eight chapters, and as a County Medical Officer of Health who has given much special study and thought to this subject, he naturally deals largely with preventive action, and the prophylactic measures which he recommends are sound and practical; it would

[1] "L'Auscultation Pulmonaire Moderne: Mécanisme des Bruits d'Auscultation Séméiologie Respiratoire dans ses rapports avec la Clinique, la Radiologie et l'Anatomie pathologique." Par H. Jumon (de la Bourboule), Ancien Interne des Hôpitaux de Paris, Lauréat de l'Académie de Médecine. Pp. 216 avec 30 figures. Paris: Éditions Médicales, Robert Maloine, 27, Rue de l'Ecole-de-Médecine. 1929. Prix 20 francs.

[2] "The Prevention of Human Tuberculosis of Bovine Origin." By William G. Savage, B.Sc., M.D., D.P.H., County Medical Officer of Health, Somerset. Pp. vii + 195. London: Macmillan and Co., Ltd., St. Martin's Street, W.C. 1929. Price 10s. 6d.

appear, however, from the preface that the author is somewhat impatient of the effort and cost expended on the modern conservative methods of treatment which have proved so successful in cases of non-pulmonary tuberculosis. In the first chapter of the book the vehicles of infection are discussed, and the predominating rôle of milk as a medium for the conveyance of bovine tubercle bacilli to human subjects is rightly emphasized. As regards butter and cream, Dr. Savage states that while they cannot altogether be ignored, their responsibility is a small one, while other vehicles are of even less significance. The amount of human tuberculosis of bovine origin is dealt with in Chapter II. And here is given a concise account of the views and findings of well-known investigators in this country, in America, and on the Continent, adequately supported by statistical evidence; this chapter will be of special interest to Medical Officers of Health, and its conclusion is summarized in the following words: "The tubercle bacillus is responsible for a large number of infections not ending in death but causing in the aggregate a vast quantity of suffering and in addition leading to a great financial drain on our resources." A subject of interest to veterinary surgeons—namely, the extent, distribution and methods of spread of tuberculosis in bovines—is dealt with in the following chapter. The account is necessarily curtailed, but it is admirably lucid and concise, and much valuable statistical evidence is included. One point to which Dr. Savage refers merits special attention—namely, that the first stage of tuberculosis of the udder can only be detected by the bacteriologist. The remaining chapters in the book are concerned with prophylactic action and the various methods to be adopted to reduce tuberculosis in cattle and to prevent and eliminate human tuberculosis of bovine origin. To eliminate tuberculosis from cattle, the building up and maintaining of herds free from tuberculosis on the lines recommended by Professor Bang's method is advocated, and due emphasis is laid on systematic veterinary inspection, early diagnosis, and the value of the guinea-pig inoculation test in the detection of tuberculous milk. The vexed subject of immunity is discussed cogently and sanely, and Calmette's prophylactic vaccination with B.C.G. Vaccine is considered but with reservations. One is glad to see that on the subject of attempting some degree of immunization by giving children tuberculous milk, Dr. Savage expresses himself strongly as follows: "It is a procedure so unwarranted that I feel its advocates cannot have realized its full implications." The vexed question of pasteurization is also fully discussed, and Dr. Savage well expresses the obvious view when he says that pasteurization is a confession of failure which admits that the ordinary public health procedures which we rely upon have failed to provide a clean, pure milk supply, although he agrees that it is a remedy which from the narrow point of view of the prevention of human tuberculosis of bovine origin largely meets the need. This book is a noted contribution to the literature on an important subject, and it will well repay close study by Medical Officers of Health, Tuberculosis Officers, Veterinary Surgeons, and all those who are interested in the problem of tuberculosis.

H. Hyslop Thomson, M.D., D.P.H.

BOVINE TUBERCULOSIS.

Dr. Januschke's monograph on tuberculosis in cattle deserves the serious study of all students of the tuberculosis problem.[1] The subject-matter is dealt with under ten headings. The first four treat of the causal agent itself, the relationship between the human and bovine types and other pathogenic and non-pathogenic acid-fast organisms, ports of entry, and spread of the disease. Some twenty-nine pages are allotted to a description of the lesions in different organs, a discussion of the course of the disease under experimental and natural conditions, the questions of natural healing and race deterioration from tuberculosis. The fifth section is devoted to diagnosis. This is considered under the following heads: Tuberculin tests, clinical diagnosis, bacteriological diagnosis, microscopical and cultural methods, animal and serological tests. The sixth section deals with protective and preventive measures, including protective and curative inoculation and chemo-therapeutic remedies. The remaining sections consist of a discussion of the struggle against tuberculosis of bovines and a description of the methods which have been employed to build up tubercle-free herds in many parts of the world. The importance of bovine tuberculosis to the health of the people and their protection by adequate inspection of milk and meat are dealt with at some length. In an attempt to meet the requirements of veterinary inspectors and practitioners, medical practitioners, and agriculturists, a very wide field has been traversed in the somewhat limited space of 327 pages, with the inevitable result that while certain aspects are dealt with at undue length in comparison with the rest, as, for example, the author's modification of the intra-palpebral test, others, of considerably greater importance, receive insufficient attention. In many instances on subjects regarding which opinions are divided all the important views are not mentioned. The book contains much valuable information, some of which is not readily accessible elsewhere, is presented in a concise and acceptable form, and should prove of especial value to those for whom it was written. The publishers' share of the work has been very well done.

PROFESSOR J. BASIL BUXTON, M.A., F.R.C.V.S.

A RÖNTGEN ATLAS OF PULMONARY TUBERCULOSIS.

The editor of the well-known "Tuberkulose-Bibliothek," Professor Lydia Rabinowitsch, has combined under one cover numbers 29 and 32 of the series, dealing with the radiographic appearances found in tuberculosis of the lungs in the adult.[2] A great deal of care has been expended in blending the two volumes, and the result is very satisfactory, as the book now forms a very comprehensive study on the subject of diagnosis and the results of the various operative procedures

[1] "Die Tuberkulose des Rindes: ihre Bekampfung vom landwirtschaftlichen und vom volksgesundheitlichen Standpunkte sowie ihre gerichtliche Bewertung als Gewahrmangel." By E. Januschke, Dr. med. vet. Troppaw. Berlin: Urban and Schwarzenberg. 1929. Price 18 marks.

[2] "Röntgenatlas der Lungentuberkulose des Erwachsenen." Von Dr. med. Hanns Alexander und Dr. med. Arthur Beekmann. Pp. 494; with 321 radiographs and 4 diagrams. Leipzig: Verlag von J. A. Barth, Salomonstrasse, 18B. 1929. Price R.M. 40.

employed in the treatment of pulmonary tuberculosis. The introductory text and index have been rewritten and improved. Most of the former illustrations are included, with the addition of over eighty new radiographs, accompanied by descriptive pages. The reproductions, though small, are well executed, and in almost every instance clearly depict the points made in the text. The paper and printing are good, and an increase in the size of the page makes the book more comfortable to handle. This excellent work, covering as it does the whole range of the subject, can be recommended as a valuable addition to the reference library of the physician or the radiologist.

J. E. A. LYNHAM, M.D., D.M.R.E.

PULMONARY TUBERCULOSIS.

Dr. L. S. T. Burrell has provided tuberculosis officers and other medical advisers undertaking the care of consumptive patients with an up-to-date, comprehensive, and really helpful guide to the modern management of the subjects of pulmonary tuberculosis.[1] The volume is a member of the "Recent Advance Series" issued by Messrs. J. and A. Churchill, and is certainly one of the best practical expositions of the subject with which we are acquainted. It is a book which will be of interest and value to the physician specializing in tuberculosis work as well as admirably meeting the needs of the practitioner desirous of keeping abreast with present-day approved advances in dealing with consumptives. Dr. Burrell has played the part of an experienced and broad-minded judge, and has concentrated on views, drugs, methods, and procedures which have justified themselves, wasting no time on the many would-be remedies and measures which enjoy but a short vogue, and, speedily going out of fashion, are discarded by sound advisers. His work opens with a suggestive consideration of pathological facts and views, which he conveniently summarizes as follows: (1) "There is a natural reaction to tubercle bacilli, and that leads to the formation of tubercles and, ultimately, fibrosis. (2) That there is also an acquired reaction to tubercle bacilli which is inflammatory and tends to retard the rate of spread of tuberculous infection. This gives time for barriers of defence to arise, and these always delay and may completely arrest the spread of the disease. (3) Reinfection can occur, and adults as well as children can be reinfected. (4) Immunity or lack of immunity does not wholly account for the variations in mortality under different conditions. There are probably some factors in the body which affect the growth or spread of tubercle bacilli and which vary under certain conditions, but which are not necessarily peculiar to the immune state. (5) The site of the infection is of the greatest importance. A degree of tuberculosis which would prove rapidly fatal in one part of the body would produce few, if any, ill-effects in another." In the chapter on Prevention is discussed the Grancher System and also B.C.G. (Billie-Calmette-Guerin bacillus preparation), and it is admitted that "in spite of varying experimental reports it would seem certain that B.C.G.

[1] "Recent Advances in Pulmonary Tuberculosis." By L. S. T. Burrell, M.A., M.D. (Cantab.), F.R.C.P. (Lond.), Senior Physician to Royal Free Hospital and Physician to Brompton Hospital for Consumption and Diseases of the Chest. Pp. vi+217. With 32 plates and 17 figures in text. London: J. and A. Churchill, 40, Gloucester Place, Portman Square, W. 1. 1929. Price 12s. 6d.

injected subcutaneously does give relative immunity for a time," but opinions differ widely as to the duration of the immunity. There is a good chapter on Diagnosis, in which the reader is reminded that there are two essential questions to be answered: (1) Is the patient infected with tuberculosis; and, if so, (2) are the symptoms (or some of them) due to the tuberculosis or to some other cause? Dr. Burrell's study of radiology in pulmonary tuberculosis, illustrated as it is by a series of skiagrams, is particularly helpful. The difficult subject of prognosis, often shirked and much neglected in most medical schools, is here effectively discussed. The book will be of great service to tuberculosis officers and other practitioners dealing with actual cases of pulmonary tuberculosis, for the major part is devoted to therapeutic measures, the management of symptoms and complications, including pleural effusion, pneumothorax and empyema, and surgical procedures. The author is an enthusiastic believer in sanocrysin in selected cases. As regards tuberculin he says: "(1) The improvement which occasionally follows tuberculin reaction may be seen after shock following the injection of other substances, such as normal horse serum. Apart from this action, tuberculin has no therapeutic value whatever. (2) An overdose of tuberculin may do considerable harm, but it is a perfectly safe method of treatment if used by anyone with experience. The dangers of tuberculin have been very much exaggerated, and any ill-effect is due to its misuse, and not its use." There is an excellent exposition of sanatorium treatment. Over seventy pages are devoted to artificial pneumothorax, the technique of which is described in detail, and numerous skiagrams are given, together with references to cases. At the end of each section are bibliographical references. This necessarily condensed notice, it may be hoped, will be sufficient to indicate that Dr. Burrell's concise handbook is a really reliable and serviceable guide which should be in the hands of every medical practitioner dealing with consumptive cases.

Dr. R. C. Wingfield, who has had long experience at the Tuberculosis Department of St. Thomas's Hospital and at the Brompton Hospital Sanatorium at Frimley, has accomplished a fine service in providing present-day students with an up-to-date, well-balanced, and complete textbook on pulmonary tuberculosis.[1] It is an ambitious work, admirably printed on art paper, and with a fine collection of judiciously selected illustrations and charts. The author justly claims that the State Tuberculosis Scheme, the service of which is steadily increasing in efficiency, ultimately depends on the capability of the rank and file of the medical profession as represented in the general practitioner, who as panel doctor and private medical adviser is the first to have an opportunity of forming an early and correct diagnosis and directing the way to adequate measures of treatment. But there is grave difficulty in providing the medical student and young practitioner with the practical clinical knowledge which he so much needs. As Dr. Wingfield says in his preface: "The Tuberculosis Scheme, by

[1] "A Textbook of Pulmonary Tuberculosis for Students." By R. C. Wingfield, B.A., M.B. (Oxon), F.R.C.P., late Physician in Charge of the Tuberculosis Department St. Thomas's Hospital; Medical Superintendent Brompton Hospital Sanatorium, Frimley. Pp. xvi + 401, with 52 plates and 92 figures and charts. London: Constable and Co., Ltd., 10 and 12, Orange Street, Leicester Square, W.C. 2. 1929. Price 31s. 6d.

segregating the consumptive for observation and treatment into the municipal dispensaries, special departments of general hospitals, and special institutions, has largely removed that disease from the general departments of our teaching hospitals just at the time when it is more important than ever that the student should have every chance to study it. At present, if he wishes to make this study, he has to take a special voluntary course in tuberculosis in the same way and for the same reason that he has to take a compulsory course in the State-controlled specific fevers and mental diseases"; and he adds: "It may be that in future a compulsory course in tuberculosis will be added to, or combined with, the specific-fever course." Whatever the future may have in store, it is clear that then as now a reliable textbook will be essential, and certainly Dr. Wingfield has supplied a need in a particularly effective manner. In the introductory chapter Dr. Wingfield presents a striking summary of tuberculous disease of the lungs viewed from the standpoint of final results: "(1) The progress of the disease may be inexorable, with intermissions perhaps of varying length and degree, but showing a steady increase in severity of all symptoms with no real response to treatment, and ending fatally. (2) Death may come dramatically from some severe and unexpected complication, or from a sudden failure of resistance. (3) The response to treatment may be fairly satisfactory, and result in a deadlock, or sort of war of attrition, in which it can be recognized, but with difficulty, that the tuberculosis is on the winning side, the result for the patient being a more or less incapacitating quiescence. In these cases the fatal issue is usually inevitable, but may be long delayed, and there always remains the chance that the case may turn into one of type No. 4. (4) The response to treatment is a cure. The cure may be partial, with some symptoms of incapacity, or complete; it may be temporary or permanent. Temperament, treatment, immunity, and some unclassifiable factor which may be called 'luck,' are responsible for the cure, and further determine whether it shall be partial or complete, temporary or permanent." The opening chapters deal with the Tubercle Bacillus, Epidemiology, and Ætiology; and then follow chapters on Morbid Anatomy, Symptomatology, Physical Signs, Diagnosis, Complications, and Classification and Assessment. Practically half the book is devoted to treatment, and this part opens with an excellent account of what is designated Routine Treatment. Then comes a practical presentation of means for alleviating symptoms and meeting complications. A short chapter on Drug Treatment opens with the dogmatic statement that "there is no form of drug treatment for the cure of tuberculosis of the lungs in general use at the present time. It will not be far from the truth to say that there is no drug (save perhaps sanocrysin) that has any specific effect on the tubercle bacillus or the tubercular lesion." Much space is given to the consideration of collapse therapy and the production of artificial pneumothorax. A special chapter is allotted to tuberculin, and here the author is non-committal: "It is not correct to say that the medical profession will wilfully ignore a new but useful treatment. It does not; it loves a new thing, but the impulsive rashness with which it tries new remedies is fortunately counteracted by the promptness with which it drops them when they do not fulfil the promises made for them. Judged by this standpoint, tuberculin is found wanting, but this failure may be due to our lack of knowledge

of its correct preparation or use. And since careful and competent phthisio-therapists have found and stated that tuberculin has its uses, and since no line of attack in the treatment of a case of phthisis must ever be neglected, tuberculin must be studied." An appendix provides descriptions of the technique of simple laboratory procedures, such as examination of sputum and determination of blood sedimentation rate. This notice, although necessarily restricted, will indicate that Dr. Wingfield has produced a comprehensive work of permanent value, and one which can be warmly commended to all who desire a complete presentation of present-day knowledge regarding all aspects of the problem of consumption. The book is the outcome of close personal contact with the subjects of pulmonary tuberculosis and an extensive study of the literature of the subject. We regret that in a student's textbook Dr. Wingfield should have continued the use of the discarded designation "tubercular" for lesions which are now in official reports and by general consent termed "tuberculous."

ACTINOTHERAPY AND ELECTROTHERAPY.

Dr. F. H. Humphris has just issued a new and fifth edition of his comprehensive handbook on the therapeutic uses of artificial sunlight.[1] The first edition was printed as recently as 1924, and at once was approved as providing a lucid and practical guide to actinotherapy. In this fresh field of research and therapeutic activity progress is so rapid that it is not surprising that the author should be so speedily allowed an opportunity of bringing his valuable work up-to-date. There has been thorough revision and additions which have added to the practical value of the book. It is just the volume which the busy practitioner appreciates, for it furnishes him in a concise and manageable form with all such information and guidance as he requires. Experts also will find much that will be helpful. There is an interesting historical introduction and statement regarding fundamental facts and hindering fallacies. Considerable space is devoted to a consideration of apparatus and technique, and then follows a description of the employment of ultra-violet rays in various systemic and local diseases. There is a warning chapter on contra-indications, and this is followed by one on X-rays as a complement to actinotherapy. There is an excellent section on ultra-violet therapy in tuberculosis. The following statement appears in italics: "It must be premised as an article of faith that every case of tuberculosis should be treated with ultra-violet radiation, whether this be derived from the sun or from any artificial source." It is immediately added that "in patients suffering from pulmonary tuberculosis ultra-violet radiation must be administered with caution." Dr. Humphris urges that "it seems imperative in all forms of tuberculosis in which ultra-violet radiation is applied to administer both general and local irradiations, though the general irradiation must be regarded as the more important." It is to be hoped that in the next edition the author will replace the now properly discarded designation "tubercular" for the generally approved term "tuberculous." The

[1] "Artificial Sunlight and its Therapeutic Uses." By Francis Howard Humphris, M.D. (Brux.), F.R.C.P. (Edin.), M.R.C.S. (Eng.), L.R.C.P. (Lond.), L.M. (Rot., Dublin), D.M.R.E. (Cantab.). Fifth edition. Pp. xxi + 340, with 31 figures. London: Humphrey Milford, Oxford University Press, Amen House, Warwick Square, E.C. 4. 1929. Price 10s. 6d.

volume is furnished with a glossary and a bibliography. It is admirably printed and illustrated, and it should be noted that it appears as one of the Oxford Medical Publications.

Dr. Turrell's comprehensive exposition of electrotherapy, which was first published in 1922, has now passed into its second edition, having been thoroughly revised and in some parts rewritten.[1] Chapters have been added on the history of medical electricity, accidents liable to attend its application, and practical details regarding its application. It is interesting to find that special attention is devoted to the rôle of the skin: "a relay station at which external stimuli are received and thence relayed by the path of the afferent nerves to the various nerve centres concerned with the regulation of the ductless glands and other organs of the body," and it is added that "the constant current is the most effective agent at our disposal for the local stimulation of these skin reflexes." The section on ultra-violet radiation has been considerably extended, but radiotherapy is only dealt with to the extent to which it can be readily and effectively applied by the electrotherapist. The chapter on electrical accidents is specially valuable, and deals with Professor Jellinck's important researches. Considerable space is devoted to appliances and technique. The work is conveniently divided into six parts dealing with: The History of Electrotherapy, The Therapeutic Action of Current Electricity, The Therapeutic Action of Radiant Energy, Electro-Pathology, Electro-Diagnosis, and the Application and Mode of Action of Electricity in Certain Diseased Conditions. There is a section dealing with ultra-violet radiation in tuberculous glands: "For cervical adenitis the tungsten arc should be applied locally to the neck so as to produce a second degree erythema, and the tungsten or carbon arc should be applied to the back to a degree sufficient to yield a first degree erythema." The work is the most up-to-date and serviceable of its kind and it is admirably produced. There are helpful illustrations, and at the end of most of the chapters bibliographical references are given.

BOOKS FOR MEDICAL ADVISERS AND WORKS OF REFERENCE.

Dr. J. B. McDougall has provided students and practitioners with an elaborate study of the science and art of percussion in the investigation of chest cases.[2] The author believes with Minor that "in percussion more than in any other diagnostic procedure a good result depends upon a perfect technique," and his lucid exposition certainly provides, as far as a book can, a faithful and complete guide to this important method in physical diagnosis. The work is divided into four parts, dealing respectively with historical considerations, detailed study of the technique of thoracic percussion, the acoustic aspect of the procedure, and variations obtained in the percussion note in certain

[1] "The Principles of Electrotherapy and their Practical Application." By W. J. Turrell, M.A., D.M., B.Ch. (Oxon), D.M.R.E. (Cantab.), Physician in Charge of the Physiotherapy Department, Radcliffe Hospital, Oxford, etc. Second edition. Pp. xvi+413. London: Humphrey Milford, Oxford University Press. 1929. Price 16s.

[2] "Percussion of the Chest." By J. B. McDougall, M.D. (Glas.), F.R.C.P. (Edin.), F.R.F.P.S. (Glas.), Medical Director British Legion Village, Preston Hall, Aylesford, Kent. Pp. vi+143, with 10 illustrations. London: H. K. Lewis and Co., Ltd., 136, Gower Street, and 24, Gower Place, W.C. 1. 1929. Price 6s.

diseases of the chest. Portraits are given of Leopold Auenbrugger and Jean Corvisart, to both of whom we owe much in the development of thoracic percussion. Reference is made to Skoda, Kronig, Turban, Goldscheider, and others. The essential part of the volume consists of detailed descriptions and discussions, with illustrations which fully explain the author's views and methods regarding the conduct of percussion, and the clinical information which it affords. Dr. McDougall contends that in cases of chronic phthisis percussion, when correctly performed, is of inestimable value as an aid to diagnosis. His section on pulmonary tuberculosis deserves careful consideration by every tuberculosis officer. Indeed, the whole manual is such a thoughtful and helpful exposition that it should be read by all medical advisers who have to deal with chest cases, and particularly those in which tuberculous lesions are suspected. There is a short bibliography, but no index.

Dr. H. P. Newsholme's new work is one which medical officers of health, tuberculosis officers, and all serious students of medico-sociological problems cannot afford to neglect.[1] It is a highly original, able, and suggestive study of fundamental factors underlying the maintenance of health and leading to the production of disease. The chapter on tuberculosis provides a comparatively new and broad outlook on physical and psychical agencies which may influence seed and soil in the establishment of tuberculosis. Dr. Newsholme's speculations and thought-compelling hypothetical explanations indicate, as he himself states, that "we have not necessarily reached finality in our views on the part played by the tubercle bacillus in tuberculosis, and that further investigation may smooth out the discrepancy in the analogy between the etiology of tuberculosis and that of encephalitis lethargica." Certainly Dr. Newsholme's views, particularly as regards the part played by psychical agencies in tuberculosis, should receive unprejudiced consideration by all who are dealing with tuberculous patients.

Mr. Stanford Cade's monograph on the radium treatment of cancer should be in the hands of every medical adviser, for it provides the most concise, up-to-date, and helpful account of the present position of radium therapy which has yet been published.[2] The Foreword to this elegantly produced work is signed by the author's colleagues on the surgical staff of Westminster Hospital. Mr. Cade, while admitting that radium therapy is in its infancy and on trial, seeks in his timely and lucidly expressed book to indicate the present position, and to provide guidance to those surgeons who have an opportunity of availing themselves of the new weapon in their armamentarium for combating malignant disease. The work consists of sixteen chapters, the first three being devoted to a consideration of radio-activity, methods of irradiation, and general principles of radium therapy. Then follow detailed descriptions of the technique for dealing with cancer in the

[1] "Health, Disease, and Integration: An Essay based on a Study of Certain Aspects of Encephalitis Lethargica." By H. P. Newsholme, M.A., M.D., F.R.C.P., B.Sc., D.P.H., Medical Officer of Health, City of Birmingham. Pp. 327. London: George Allen and Unwin, Ltd., 40, Museum Street, W.C. 1. 1928. Price 12s. 6d.

[2] "Radium Treatment of Cancer." By Stanford Cade, F.R.C.S., Assistant Surgeon, Joint Lecturer on Surgery and Teacher of Practical Surgery, Westminster Hospital. Pp. x + 158, with 13 coloured plates and 49 text figures. London: J. and A. Churchill, 40, Gloucester Place, Portman Square, W. 1. 1929. Price 15s.

various regions of the body. The concluding chapter deals with the important question of the protection of radium workers. At the end of each chapter is a select bibliography. The work is of special value on account of its records of individual illustrative cases. The plates in colour and the illustrations in the text have been carefully selected and are highly instructive. Mr. Cade and also his publishers are to be congratulated on the prompt and admirable way in which a much-needed work has been provided in a particularly effective form.

Dr. Crofton's handbook on endocrinology, now in its second edition and based on lectures delivered at University College, Dublin, has undergone revision and extension in order to bring it up to-date in regard to this rapidly advancing department of physiology and applied medicine.[1] The work is addressed to general practitioners and senior medical students, and deals in a series of twelve chapters with the nature, action, products, and uses of such glands as the pineal, pituitary, suprarenal, thyroid, parathyroid, and thymus. There are special sections on the gonads, hormones of the gastro-intestinal tract, the pancreas, and the liver, including its employment in the treatment of cases of pernicious anæmia. Dr. Crofton is an enthusiast in his belief of the value of endocrines and the use of specially prepared microbial products in the treatment of many forms of disease. Although his book contains much that is at present hypothetical and necessarily provisional it goes far to meet a real need in presenting a suggestive outline in concise and helpful form regarding the present position of believers in endocrine therapy. The concluding chapter is devoted to supplemenary notes on recent advances. The value of this interesting introduction to endocrinology is considerably enhanced by the well-selected illustrations.

Dr. A. R. Friel is a strong advocate of the treatment of chronic otorrhœa by means of zinc ionization, and has set forth his claims, experience, and methods in a serviceable brochure.[2] He particularly recommends the technique he describes for dealing with elementary school children attending hospitals and aural and school clinics under conditions prevailing in large towns. The author was the founder of the first ionization centre for this class of child. His book is divided into three parts: The Rôle of the Electric Current and Zinc Ions in the Treatment of Septic Surfaces, Condition of the Ear in Chronic Otorrhœa and Technique of Treatment, and The Importance of Policy and of Organization. Dr. Friel's manual provides a detailed account with instructive illustrations of the manner in which persistent otorrhœa may be overcome, and since some of these cases appear to be of tuberculous origin, or at all events occur in tuberculous children, it is certainly much to be hoped that tuberculosis and school medical officers will study his suggestive and practical book.

Dr. J. R. Gillespie is a believer in the therapeutic value of tubercu-

[1] "An Outline of Endocrinology." By W. M. Crofton, B.A., M.D., Lecturer of Special Pathology University College, Dublin, and Pathologist Dr. Steevens' Hospital, Dublin. Second edition. Pp. xii + 163, with frontispiece and 53 figures. Edinburgh: E. and S. Livingstone, 16 and 17, Teviot Place. 1929. Price 8s. 6d.

[2] "Notes on Chronic Otorrhœa, with Especial Reference to the Use of Zinc Ionization in the Treatment of Selected Cases." By A. R. Friel, M.A., M.D. (Dublin University), F.R.C.S.I., Assistant Aurist, School Medical Service, London County Council. Pp. viii + 88, with tables and 54 figures. Bristol: John Wright and Sons, Ltd. 1929. Price 6s.

lin, and has set forth in a concise brochure the faith that is in him.[1] He discusses tuberculin reactions and factors to be considered in the administration of tuberculin, and explains the aims of tuberculin therapy in pulmonary tuberculosis and the technique he advocates.

Weather is a subject of world-wide interest, and is closely related to many problems concerning health and disease. In this country particularly, weather conditions furnish a never-failing subject for discussion. Medical advisers, both on their own account as well as in the interests of their patients, have of necessity to pay heed to meteorological facts. Every sanatorium should be to some extent a meteorological station, and medical superintendents and other members of the staff of institutions devoted to the conduct of open-air measures should be weather-wise. We therefore have no hesitation in strongly commending to the notice of readers of this JOURNAL the handsome and comprehensive volume on weather which has been prepared with much care by Messrs. E. E. Free and Travis Hoke, and finely illustrated by Miss Elise Seeds.[2] We know of no more attractive and instructive work on meteorology and the cultivation of weather sense; it is an ideal book for the busy doctor and nurse, and all sensible patients and other thoughtful citizens, for it makes the study of weather an enjoyable hobby as well as a scientific pursuit of practical utility. The work is manifestly of American origin, but it should be read and appreciated on both sides of the Atlantic. We would particularly commend for medical consideration the chapters on the Menace of Fog—"man's only unconquered enemy among the aspects of weather"; Weather Comfort, in which reference is made to the work of Professor Leonard Hill; and Climate and Health. In the latter appears the dogmatic pronouncement that "a small, reasonably regular dose of ultra-violet rays is essential to human health. Man cannot live always in the dark and remain well." It is interesting to note that it is admitted that "certain individuals, mostly the old and the ill, are able to predict some weather changes by their bodily symptoms," a satisfactory explanation for which fact is still not forthcoming. The volume closes with useful bibliographical references. If it were only for the sake of the novel, old-fashioned maps provided by Miss Seeds and the beautiful reproductions of actual photographs we should say regarding this charming work, get it.

Dr. Maurice Parmelee has added to his striking series of works on personality, behaviour, and social problems a remarkable monograph on nudity as an æsthetic, hygienic, humanitarian, and democratic manner of life.[3] In post-war Germany the practice of nudity or "nacktkultur" is becoming increasingly popular with many men and women in all ranks of society. Dr. Parmelee describes this nudity movement, which he designates the new gymnosophy. He is himself an enthusiastic

[1] "A Rational Method of using Tuberculin in the Treatment of Pulmonary Tuberculosis." By John R. Gillespie, M.A., M.D., B.Ch., B.A.O., D.P.H., Tuberculosis Medical Officer, County Down, Ireland. Pp. 33, with tables and chart. Belfast: Graham and Heslip, 41, Franklin Street. Price 2s. 6d.

[2] "Weather: Practical, Dramatic, and Spectacular Facts about a Little Studied Subject." By E. E. Free and Travis Hoke, with maps and drawings by Elise Seeds. Pp. 337. London: Constable and Co., Ltd., 10, Orange Street, W.C. 2. 1929. Price 14s.

[3] "Nudity in Modern Life: The New Gymnosophy." By Maurice Parmelee. With an Introduction by Havelock Ellis. Pp. xiii+303, with frontispiece and 14 plates. London: Noel Douglas, 38, Great Ormond Street, W.C. 1. 1929. 12s. 6d.

gymnosophist, and his work is an exposition of the history, philosophy, principles, and practices of the system of nakedness, which he advocates on cultural and ethical grounds as well as in the interests of human health and happiness. All aspects of the new gymnosophy are fully discussed. The chapter in which man is considered as "the air and light animal" will be of special interest to tuberculosis officers, medical superintendents of sanatoria, directors of open-air schools and centres where tuberculous and other subjects are undergoing heliotherapy. Many will doubtless consider Dr. Parmelee's study idealistic and utopian, and will view gymnosophy as a menace to morals, social amenities, and civilization. His unique book certainly deserves the unprejudiced consideration of all medical advisers, students of psycho-physiological problems, and leaders of public opinion. The book is extensively illustrated with reproductions of photographs indicating men and women engaged in the practice of nudity. The author's notes and references at the end of the volume will be of special value to serious students of the subject.

A new edition of "Lippincott's Pocket Formulary" has recently been published. This work has been extensively used and generally approved in America, and deserves to be known in this country, for it provides in compact, readily accessible form just the information which the busy practitioner constantly requires. Part I. presents diseases in alphabetical order, with therapeutic prescriptions and notes regarding treatment. Part II. supplies in tabular form lists of drugs and preparations, with essential data regarding solubility, etc., dosage, action, and uses. Part III. gives in similar tables particulars of new and non-official remedies, together with miscellaneous information, including weights and measures, metric systems, list of incompatibilities, guidance in analysis, etc. The second edition has been thoroughly revised and brought up to date. Under such headings as Pulmonary Tuberculosis, Bronchitis, Pharyngitis, are many excellent formulæ and suggestions which tuberculosis officers will appreciate.[1]

Mr. Victor Dane's brochure on Sunlight Cure is a popular, lucid exposition of helio-hygiene and helio-therapy in non-technical language. It is written by an enthusiastic layman for laymen, and contains much information in a serviceable form on sun-bathing. There are chapters on artificial sunlight, colours and their effect on health, the hygiene of clothes, deep breathing, and other measures making for the maintenance of health and the prevention and arrest of disease.[2]

Camping has now become a popular recreation and holiday measure for the healthy, and under supervision may prove advantageous to many who are delicate or tuberculously inclined and stand in need of an open-air life. With the coming of the automobile camping has been rendered a more practicable measure both for health-seekers and holiday-makers. Mr. C. W. Wilman has provided a practical little manual on camping by car.[3] Owner-drivers and enthusiastic campers

[1] "Lippincott's Pocket Formulary." By George E. Rehberger, M.D. Second edition, revised. London: J. B. Lippincott Company, 16, John Street, Adelphi, W.C. 2. 1928. Price 15s.

[2] "The Sunlight Cure: How to Use the Ultra-Violet Rays." By Victor Dane. Pp. 80, with illustrations. London: Athletic Publications, Ltd., Link House, Greville Street, E.C. 1. 1929. Price 1s.

[3] "Camping by Car." By Charles W. Wilman. Pp. 114, with 18 illustrations in line and half-tone. London: Cassell and Co., Ltd. 1929. Price 2s.

will be well advised to study this concise and informing handbook, for it is full of hints, suggestions, and directions all based on practical experience regarding the how and why and wherefore of motor camping.

Under the title of "The Open Road" the publishers of the *Sunday Chronicle* and *Daily Dispatch* have issued a new and revised edition of their novel and justly popular pocket guide for motorists, tourists, and cyclists. It is a work which we commend to all health and holiday seekers on modern wheels. There are particulars of over 700 routes specially revised by the Automobile Association, together with a large coloured road map of Great Britain, with key and sixteen sectional maps of touring centres, many practical memoranda, and an excellent index.[1]

English-speaking doctors from overseas and other visitors to this country, especially those from America, will welcome the new, up-to-date, condensed guide issued as an official handbook by the White Star Line, the London headquarters of which are at 1, Cockspur Street, S.W. 1, and 38, Leadenhall Street, E.C. 3.[2] It is an indispensable companion and councillor for those who desire information and guidance in making the best of a short stay in this country. There are serviceable sections on London, a descriptive gazeteer of the British Isles, American pilgrim shrines, notable centres and districts, references to universities and public schools, an almanac of social and sports events, and descriptions of touring areas, with much other miscellaneous matter of general interest.

Messrs. Steward and Ardern, Ltd., distributors of Morris cars, Morris House, The Vale, Acton, W. 3, have issued under the title of "Blue Book of Sport" a handsome illustrated 143-page volume giving sketches and particulars of a series of week-end wanderings by car, records of notable achievements in sports, and a collection of articles and pictures relating to the care of the car and the delights of motoring. This publication will appeal to those who are interested in outdoor sports and pastimes and are drawn by the charms of the countryside and own or intend to own a car. Copies may be obtained free on application to the Sports Editor.

Through the courtesy of the Austrian Legation, 18, Belgrave Square, S.W. 1, we have been favoured with a copy of the English version of the guide-book prepared for the information and guidance of English-speaking friends of Austria and visitors to the country. In addition to sections dealing with Austria's constitution and politics, financial and economic conditions, there are accounts of the aims and work of British and American societies in Austria, including the activities of the American Medical Association of Vienna. The work should be consulted by every doctor and all others proposing to visit Austria, and especially those who desire to study in Vienna.[3]

[1] "The Open Road for Motorists, Tourists, and Cyclists." Pp. 221, with coloured road map and 16 large scale maps of the principal town areas, with over 700 routes. Manchester: Offices of *Sunday Chronicle* and *Daily Dispatch*, Allied Newspapers Ltd., Withy Grove. London office: 200, Gray's Inn Road, W.C. 1. 1929. Price 2s.

[2] "The British Isles: A Guide for Overseas Visitors." Fourth edition. Pp. xlix+458, with 28 maps and plans. London and Cheltenham: Ed. J. Burrow and Co., Ltd. 1929. Price 3s. 6d.; in U.S.A. and Canada $1.

[3] "The Austrian Year Book." Edited by the Austrian Federal Press Department of the Federal Chancellory, Vienna. 1929.

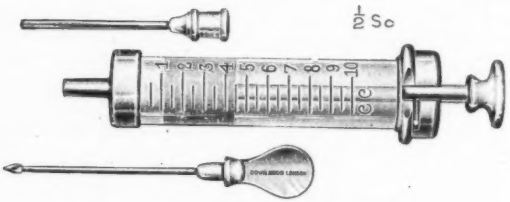
PREPARATIONS AND APPLIANCES.

DIAGNOSTIC AND HYGIENIC APPLIANCES AND THERAPEUTIC PREPARATIONS.

THE NEW POCKET ELECTRIC AURISCOPE, as will be seen by the figure annexed, is a novelty which will be of service to many medical practitioners dealing with ear and throat cases.[1] It is designed and constructed for practical clinical service, and can be carried in the pocket ready for use. The essential part of the appliance plugs into a small portable fountain-pen torch dry battery. The various parts can be taken to pieces for cleaning, and the back lens can be removed to allow of the passage of instruments, its place being taken by a small hinged side lens. A side lens can be supplied for right- or left-hand side. The lenses focus a little beyond the tip of the speculum so that when the patient is being examined the membrana tympani is correctly in focus. Removable speculæ of various sizes can be supplied. (The price complete is 32s. 6d.)

THE NEW POCKET ELECTRIC AURISCOPE.

Dr. George Jessel, Consultant Tuberculosis Officer to the Lancashire County Council, has introduced a new and improved form of TROCAR and CANNULA which promises to be of much service in the aspiration of small tuberculous and other abscesses, particularly in children.[2] The accompanying figure indicates the outstanding points: (1) Comparatively short distance between point of trocar and the end of the cannula; (2) close fitting of the end of cannula to the trocar, which is narrowed for the purpose, thus enabling the cannula to slip easily into the opening made in the skin; (3) convenient length and bore of cannula—the dimensions of the trocar are 2 inches long, in the French catheter gauge. The trocar and cannula are to be used with a 10 c.c. metal or glass syringe. (The price of trocar and cannula is 9s. 3d., or with syringe complete, 21s. 6d.)

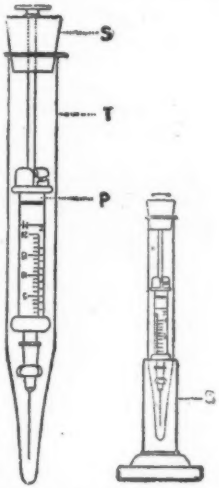


DR. JESSEL'S TROCAR AND CANNULA.

[1] Details regarding the New Pocket Electric Auriscope can be obtained from the makers, John Smith and Son (Glasgow), Ltd., 26-30, Gibson Street, Hillhead, Glasgow, W. 2.

[2] The Jessel Trocar and Cannula is made by Down Bros., Ltd., 21 and 23, St. Thomas's Street, S.E. 1.

The "ALL-READY" SPIRIT TUBE is a practical appliance which every doctor and nurse will appreciate.[1] It provides the means whereby a hypodermic syringe can be conveyed anywhere in a sterilized condition and ready for immediate use. Moreover, there is no danger of spilling the solution in which the syringe lies immersed. The spirit tube is strong, being made of toughened glass, and it stands firmly in the wooden case when being used. The syringe is of the British Record type with double graduations, and the needle is of rustless steel. (The price is 10s. 6d.)



THE "ALL-READY" SPIRIT TUBE.

Dr. Donald Stewart has designed a neat and effective SKIN BURR for the carrying out of the Pirquet tuberculin reaction.[2] It is made of well-tempered steel, and the end carrying the burr

THE STEWART SKIN BURR.

has a surface which facilitates the speedy and safe conduct of the simple technique of the test. The essential feature of this practical little appliance is indicated in the accompanying figure.

THE "MELUDOR" WATER SOFTENER.

The SOLILA NEEDLES are supplied in a series which provides for diagnostic and therapeutic requirements.[3] They are made of stainless steel, finely tempered, have lancet-like points, do not leak or clog, and are non-oxidizable and unaffected by the action of sterilizing agents, anæsthetics, etc., and are not corroded by alkalies, urine, water, etc. The Solila Needles are made in many forms and all sizes, mounted and unmounted. They are available for hypodermic, intramuscular, intravenous and other uses, and can be obtained as lumbar, spinal, and filling needles. Forms for veterinary work are also made.

The "MELUDOR" WATER SOFTENER is a novelty which will be appreciated by many who find their health suffers from drinking and using hard water.[4] It is one of the simplest means whereby the dangers of imbibing hard

[1] The "All-Ready" Spirit Tube is supplied by Charles F. Thackeray, Old Medical School, Park Street, Leeds, and 252, Regent Street, London, W. 1.

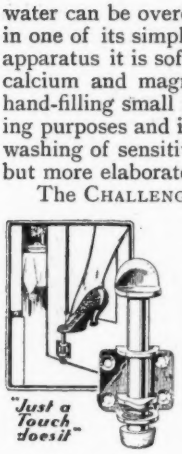
[2] The Stewart Skin Burr is made by J. Gardner and Son, 32, Forrest Road, Edinburgh.

[3] Particulars of the Solila Needles can be obtained from the Amalgamated Dental Co., Ltd., Solila House, 7, Swallow Street, Piccadilly, W. 1.

[4] Particulars of the "Meludor" Refinator or Water Softener can be obtained from the sole distributors, the Fulham Pottery and Cheavin Filter Co., Ltd., Fulham, S.W. 6.

water can be overcome. The adjacent figure indicates the "Meludor" in one of its simplest forms. By passing the hard water through the apparatus it is softened. By means of zeolite the prejudicial salts of calcium and magnesium are removed. The convenient and portable hand-filling small model indicated in the figure is serviceable for drinking purposes and in providing soft water for shaving, shampooing, the washing of sensitive face and hands, etc. (The price is 15s., post free, but more elaborate forms for fixing to supply taps can be obtained.)

The CHALLENGE DOOR HOLDER is a novelty which meets a real need, especially in hospitals, sanatoria, schools, and homes where open-air living is consistently practised.[1] The essential features of this door stop is indicated in the accompanying figure. It is simple in construction, easy to operate, and is reliable in action. Wherever doors have to be kept open and banging avoided the new door holder should be attached. It is secured on to the door near the ground and can be controlled by the foot. Pressure on the upper border presses down a rubber-covered stop and fixes the door. To release, slight pressure is made on the lower lever and the plunger springs upward, releasing its grip on the floor. (The price is 7s. 6d.)



THE CHALLENGE DOOR HOLDER.

TABLE-CLOTH CLIPS will prove invaluable for fixing cloths to the table at meals and at other times in sanatoria and elsewhere when people are living under open-air conditions.[2] (Price 3s. 6d. per dozen plated.)

THE RICHMOND HEAD REST or "Kosy-Kush" as a kapok-stuffed model was described and illustrated in the January issue of this JOURNAL. An improved form has now been introduced as a pneumatic collapsible model.[3] This, when not in use, can be packed deflated in a small pouch and carried in the pocket. For use in hospitals, sanatoria, and nursing homes a washable detachable cover in various colours is supplied. The new "Kosy-Kush" is available in several models and in stock colours with plain silk, velvet, or waterproof colours. These additional varieties will add greatly to the popularity of this hygienic and comfort-giving novelty. For invalids, travellers, motorists, and others in hospitals, sanatoria, nursing establishments, or in their own homes, as well as all convalescents and weary brain workers, this ingenious and cleverly constructed head rest is to be commended. (The price ranges from 16s. to 32s. 6d.)

THE NEW CANVAS BACK REST illustrated in the adjoining figure is an appliance which is already finding favour in hospitals and elsewhere for bed patients.[4] It consists of a body of fine, stout, shrunken, white canvas, with straps of the best quality of English bridle leather and non-rusting, nickel-plated buckles. For the nursing of many acute and

[1] The Challenge Door Holder is made by Chalco Limited, 35, Summer Row, Birmingham.

[2] The Terry Table-Cloth Clips are manufactured by Herbert Terry and Sons, Ltd., Redditch.

[3] Particulars regarding the various models of the Richmond Head Rest can be obtained from Feans Ltd., the Travel Comfort Specialists, 71, High Holborn, W.C. 1.

[4] Particulars and prices of the New Canvas Back Rest can be obtained on application to the makers, Robinson and Ensum, 50, Whitechapel Road, E. 1.

advanced cases of tuberculosis and patients suffering from serious diseases this novel back rest offers numerous advantages. It is light, portable, readily adjusted, easily detached, can be washed, and does not cause discomfort to patient or damage to bed clothes. Moreover, this bed rest can be supplied to fit any type of bed or cot. One of these bed rests can be seen in use at the Children's Sanatorium of the National Children's Home and Orphanage, Harpenden, Herts.

THE NEW CANVAS BACK REST.

Enham Industries are now providing an admirable series of furniture specially designed for use in gardens, sanatoria, open-air schools, and generally for out-of-doors service. Among these practical novelties special reference must be made to the charming and artistic ENHAM WILLOW WHEELBARROW.[1] It has a rustic appearance in harmony with a garden environment, and yet is substantial. Four sizes are available, the smaller of which are intended for children, ladies, and delicate folk. One of these pleasing wheelbarrows may be seen in use at the Harpenden Children's Sanatorium of the National Children's Home and Orphanage. (The prices are 14s. 6d., 16s. 6d., 18s. 6d., 20s. 6d., with railway carriage 2s.)

Photography provides a delightful and practical hobby which adds much to the joys of life and the advantages of an open-air existence. For all classes of patients, and particularly those who in sanatoria or elsewhere desire and need an occupation which will be pleasant and profitable, photography is to be recommended. The well-known firm of Burroughs Wellcome and Co. supply an excellent, compact, portable, and effective PHOTOGRAPHIC OUTFIT, a perfect *multum in parvo*, which supplies all the requirements of the amateur photographer who desires to make his own pictures in a convenient and serviceable form.[2] Material for developing, toning and fixing, together with full directions for the use of the "tabloid" photographic products, are contained in an artistic metal case which is so neat and handy that it will be welcome as a travel companion. We commend this novel outfit to patients and all who delight in making photographic snapshots, and so providing abiding pleasures for themselves and their friends.

The firm of R. Demuth are manufacturing a number of hygienic and therapeutic preparations likely to be of value to the general practitioner and of service to many patients in sanatoria, hospitals, and elsewhere.[3] HARMOZAN BATH SQUARES provide a hygienic coniferous preparation reproducing in some measure the popular effervescent pine baths of continental spas, and acting as a soothing, restorative, and generally refreshing agent. FROZOCLONE is a solid form of eau de Cologne which is often helpful as a smelling bottle or for rubbing into

[1] An illustrated catalogue of Enham Industries can be obtained on application to the works at Enham, near Andover, Hants, or at the London Offices, 10, Upper Woburn Place, W. 1.

[2] Full particulars of the "Tabloid" Photographic Outfit can be obtained on application to Burroughs Wellcome and Co, Snow Hill Buildings, London, E.C.

[3] Particulars regarding the Demuth Specialities can be obtained on application to R. Demuth, 68, Salusbury Road and Montrose Avenue, N.W. 6.

the forehead or elsewhere when wearied by motoring or arduous work. ANALAX is a delicious pastille which acts a mild laxative. Its active principle is phenolphthalein in association with certain vegetable acids in a basis of seaweed and sugar. "IODURUM" is a convenient form of iodine in solid form. It is contained in a metal case, and so is suitable for carrying in the pocket and is always ready for use anywhere.

OSNOL NASAL SPRAY is a new preparation issued from the Glaxo Laboratories which promises to be of service in dealing with catarrhal conditions of the nose and throat.[1] It consists of a solution of vitamin D (irradiated ergosterol) in pure neutral pertroleum, and can be applied by means of any effective atomizer suitable for oily solutions. The use of this local application brings relief in many cases where the mucous membrane of the nose and throat is involved.

LYPTROL DISINFECTANT is a new non-toxic, non-staining antiseptic and deodorant which promises to be of service not only in the sick-room, nursery, and home generally, but also in dealing with flies and other insect pests which prove so irritating to patients undergoing open-air treatment.[2] It is prepared from eucalyptus and other aromatic oils, and its Rideal-Walker coefficient is said to be 3·75. Lyptrol should be serviceable in the cleansing of rooms occupied by tuberculous cases.

ENO'S "FRUIT SALT" has for many years been justly popular as an agreeable effervescent saline laxative of standard purity.[3] It is an effective combination of alkalies with fruit acids and is prepared in accordance with scientifically directed methods. No sugar is added, and it is free from flavouring agents. In many tuberculous subjects this preparation provides just the speedy, painless, non-irritant laxative action which is desired.

LOPION is a new detoxicated gold preparation which promises to be of service in the treatment of suitable tuberculous cases.[4] Like sanocrysin it appears to exercise a beneficial chemo-therapeutic action in certain consumptive and other tuberculous cases. It is a sodium auro-allyl thio-urea-benzoate, and is said to have a gold content of about 40 per cent., but with a low toxicity. Its administration should be conducted on the customary lines now governing gold therapy in tuberculosis. Lopion is supplied as an amorphous powder in sterile ampoules, and can be rendered ready for intravenous administration when dissolved in sterilized distilled water or normal saline, but solutions must be freshly prepared.

NOVOPINE BATH TABLETS provide a portable, convenient, effective means for the preparation of a pleasing and restorative hot pine bath, which brings refreshment after exercise or a tiring day's work, and is of service in many cases of tuberculosis and other debilitating troubles.[5]

[1] Osnol Nasal Spray is supplied by the Glaxo Laboratories, 56, Osnaburgh Street, N.W. 1.

[2] Particulars regarding Lyptrol can be obtained from the manufacturers, Lyptrol Ltd., 2, College Road, Harrow, Middlesex.

[3] A trial bottle of Eno's "Fruit Salt" will be sent to any medical adviser on application to J. C. Eno Ltd., 160, Piccadilly, W. 1.

[4] Lopion is supplied in single ampoules or in boxes each containing ten ampoules ready for use in clinics, and can be obtained with full particulars from Bayer Products, Ltd., 19, St. Dunstan's Hill, E.C. 3.

[5] Novopine is supplied by Natural Products, Ltd., 40, Furnival Street, E.C. 4.

"FIELD-DAY" is something of a cosmetic novelty.[1] It is a perfumed emollient shaving cream, contained in a collapsible metal tube, which eliminates soap and shaving brush, and supplies all that the razor requires to provide a rapid, comfortable, and effective shave. Moreover, it acts as a soothing, protective, hygienic application which keeps the skin in good condition. This excellent preparation is ideal for patients undergoing sanatorium treatment, and will be appreciated by all who travel for health or pleasure.

MONSOL is a comparatively new and reliable germicide obtained from Mond oils, and is now available in various forms.[2] It possesses a high germicidal efficiency, is non irritant, has much penetrative power and low toxicity. Monsol will be of service as a disinfectant and deodorant in hospitals and sanatoria where tuberculous subjects are being dealt with. Monsol throat pastilles are useful in dealing with catarrhal, tuberculous, and other lesions. A Monsol ointment is available for dermatological cases, and there are dental and other preparations. Monsol can be administered internally in capsules.

THE OXFORD MARMALADE is a breakfast-table commodity which for many years has been popular with undergraduates and dons, and has won favour among Britishers in all parts of the world.[3] Not only for the young and vigorous is it an ideal preparation, but for the delicate and ill it is an appetizer and nutrient of much value. For many tuberculous subjects "Oxford Squish" meets a real need, providing an acceptable tempter of appetite, slightly bitter, and with a delicate aromatic flavour, and acting as a tonic and dietetic stimulant. Oxford Marmalade is prepared from selected Seville oranges and pure sugar, and is free from colouring and flavouring matter; it is manufactured under strict supervision and in accordance with scientific methods. Messrs. Cooper also provide a large series of bottled fruits and other preserves, confections and condiments, many of which are peculiarly suited to the requirements of patients of all ages in hospitals, sanatoria, nursing homes, and open-air schools, as well as patients undergoing treatment in their own homes.

The British Hanovia Quartz Light Co., Ltd., Slough, Bucks, are providing actinotherapists with a RECORD CARD, 8″ × 5″, such as will fit into a standard index-filing cabinet. It provides spaces for the insertion of all essential data and the registration of treatments. (The price is fifty for 3s. A specimen card can be obtained on application.)

AN ACTINOTHERAPY CHART has been designed by Mrs. Vaughan Cowell. It is in the form of a stout card, 8½″ × 5″, suitable for filing, and provides labelled spaces for the entry of data regarding essential facts in the treatment of a case by ultra-violet rays.[4] (The price is 9d. per dozen.)

[1] "Field-Day" is made by J. C. and J. Field, Ltd., Soap Specialists, Lambeth, S.E. 1.

[2] Specimens and particulars of Monsol and its preparations, including a booklet entitled "Monsol: Clinical and Pathological Data," can be obtained on application to the Mond Staffordshire Refining Co., Ltd., Abbey House, Victoria Street, S.W. 1.

[3] A pamphlet descriptive of Oxford Marmalade and giving a list of other preparations can be obtained from the makers, Frank Cooper, Ltd., Victoria Buildings, Oxford.

[4] A specimen of the new Actinotherapy Treatment Chart can be obtained from the publishers, Professional Publications, Ltd., 139, High Holborn, W.C. 1.

THE OUTLOOK.

TUBERCULOSIS AS A NATIONAL PROBLEM.

THE recently issued Tenth Annual Report of the Ministry of Health, 1928-1929, published by H.M. Stationery Office (price 4s.), in its section dealing with public health devotes nine pages to tuberculosis. On March 31 of 1929 the number of beds in institutions provided by local authorities for the treatment of the disease in this country had increased by 257, and proposals for the provision of about 750 additional beds have been approved. There are in England 382 tuberculosis officers, and the tuberculosis dispensaries approved number 453, exclusive of 94 out-patient departments of general hospitals and clinics approved for certain special forms of treatment. For all forms of tuberculosis there were 494 institutions, 211 provided by local authorities and 283 by voluntary bodies, and the number of beds available was 23,260, 14,856 provided by local authorities and 8,404 by voluntary bodies. Installations for treatment by artificial light have been approved at 44 residential institutions and at 24 tuberculosis dispensaries. Arrangements have also been approved for this treatment to be given to certain classes of cases of tuberculosis at 38 other institutions including 30 general hospitals. As regards actinotherapy the following opinion is expressed: "The experience so far available indicates that good results can be obtained in certain cases, but it still needs to be emphasized that the treatment is not altogether free from danger, and should always be carried out by competent and experienced persons, with close observation of the individual cases." Reference is made to the action of the National Association for the Prevention of Tuberculosis in adapting their institution at Burrow Hill, Surrey, to provide facilities for the technical instruction of youths between the ages of fourteen and nineteen while undergoing treatment for tuberculosis. A statement appears regarding financial arrangements for carrying on the National Tuberculosis Scheme. The gross expenditure of local authorities on tuberculosis schemes in 1927-28 amounted to £3,209,544. During this period the average number of occupied beds in institutions provided by local authorities was 13,355, and of beds maintained by those authorities in institutions provided by voluntary bodies was 6,040. The total of 19,395 was 589 above the average number in 1926-27. The average cost per patient per week was 48s. 11½d. as compared with 49s. 4d. in 1923-24, 49s. 11d. in 1924-25, 49s. 2½d. in 1925-26, and 49s. 5d. in 1926-27. The dispensary service cost £581,039, and the residential treatment £1,491,194. The number of tuberculous ex-service men is returned as 708. On December 31, 1928, there were on the registers of notification kept by medical officers of health 355,911 cases: 254,276 pulmonary—males 137,426 and females 116,850; and non-pulmonary 101,635—males 52,487 and females 49,148. The figures for 1928 represent a death-rate per million population from pulmonary tuberculosis and from non-pulmonary tuberculosis of 755

and 173 respectively, being the lowest death-rates ever recorded for these diseases in this country.

Sir George Newman's Report for 1928 "On the State of the Public Health," as Chief Medical Officer of the Ministry of Health, recently issued by H.M. Stationery Office (price 3s.), like all its predecessors, is an informing record and inspiring pronouncement on problems of personal and public health as studied in England and Wales. The volume extends to nearly three hundred pages, and consists of a dozen chapters dealing with such subjects as Maternity and Child Welfare, The Insurance Medical Service, The Local Government Act and The Poor Law Medical Services, General Epidemiology, Influenza, Cancer, its Incidence and Radium Treatment, Venereal Diseases, Relation of Food to Health and Disease, and Medical Intelligence, Environmental Hygiene, and International Health. Readers of this JOURNAL will be specially interested in the chapter dealing with Tuberculosis. Sir George Newman points out that it is a subject of particular importance to the public health. "First, it is one of the great constitutional diseases, springing from many origins and exerting in the body a complex influence. Secondly, it is extremely prevalent, infecting, and in greater or less degree incapacitating, large numbers of people, and contributing substantially to the death-rate. Thirdly, it is the principal type of disease illustrating the operation of social circumstances and conditions in close association with the germs of disease." The new cases of tuberculosis coming to the knowledge of medical officers in England and Wales in 1928 number 77,881, 57,682 pulmonary and 20,199 non-pulmonary. Notification is becoming more effective, but late notification is still very common, and this is not always due to any neglect of the medical practitioner. "Too frequently there has been delay on the part of the patient in obtaining medical advice, or delay on the part of the practitioner in seeking the assistance of the tuberculosis officer in regard to patients suffering from chest trouble which may have a tuberculous basis." There is clearly still much room for improvement. "In 1928, out of 77,881 total fresh cases of tuberculosis coming to the knowledge of health authorities, information was not received until after the death of the patient with regard to 4,252—*i.e.*, 5·5 per cent. This figure of 4,252 represents 11·6 per cent. of the total deaths from tuberculosis. Obviously, if a medical practitioner was in a position to certify that a death was due to tuberculosis he must have made the diagnosis during the life of the patient and should have notified the case." The number of deaths registered from all forms of tuberculosis in England and Wales for 1928 was 36,623, as compared with 38,173 in 1927. There are 382 approved tuberculosis officers. On April 1, 1929, tuberculosis work was being carried out in 473 dispensaries, and in addition 73 other premises were approved for special forms of treatment, including orthopædic out-patient care of tuberculous cripples after return from residential treatment. The sanatoria and other residential institutions providing for tuberculous cases now number 494, and 23,260 beds are available. Sir George Newman devotes a special section to the consideration of the Local Government Act of 1929 in relation to the Development of Tuberculosis Schemes, and the suggestions therein demand the consideration of all medical officers of local authorities, authorities of hospitals, and panel doctors. The Report contains an important section on After-Care. There is also an

account of immunization according to Professor Calmette's method of prophylactic vaccination of the newly-born against tuberculosis. The view is expressed that "the question of BCG must be regarded in this country as still *sub judice*." A section is allotted to a consideration of Tuberculosis in Printers. In the chapter dealing with the Relation of Food to Health and Disease there is a consideration of the tubercle bacillus in milk. In the section dealing with the question of Artificial Light Treatment a tabular return of the approved centres is given. Reference is made to the much-discussed Report of the Medical Research Council on Actinotherapy, and the following statement appears: "Scientific evidence and unbiassed clinical investigation are, as they should be, in strict accord on the subject of artificial light therapy. It is a method which requires much further investigation from the purely scientific as well as the clinical aspect, and, as regards the latter aspect, with special attention to the ultimate after-results. The evidence already assembled tends to the belief that it is not an isolated and specific method of treatment of disease, but in skilled medical hands it appears to be a valuable adjuvant to ordinary and long recognized therapeutic measures. It has its risks and limitations and even its dangers. In many instances it promotes rapid healing of lesions and thus shortens the period of institutional treatment. This is not only of benefit to the individual patient, but is of economic importance to local authorities. The best results of artificial light therapy continue to be obtained in the treatment of rickets, lupus vulgaris, and surgical tuberculosis."

TUBERCULOSIS AND THE HEALTH OF LONDON.

The recently issued Annual Report for 1928 of the London County Council's Medical Officer of Health and School Medical Officer, Dr. F. N. Kay Menzies, dealing with public health, is of special interest, particularly in view of the reorganization pending consequent on the coming into force next spring of the Local Government Act, 1929. The estimated population of London is 4,458,200; the birth-rate, 16·2; the death-rate per 1,000 of the population from all causes, 12·1; from pulmonary tuberculosis, 0·89; from non-pulmonary tuberculosis, 0·14; the infant mortality rate per 1,000 births stands at 67; while the maternal death-rate from childbirth is 3·59. The report contains interesting data relating to tuberculosis. The deaths from tuberculosis of the respiratory system during 1928 numbered ,985. There has been practically no decrease in the mortality during the past three years. The number of primary notifications in the twenty-eight metropolitan boroughs during the fifty-two weeks of 1928 was 8,586, the corresponding figure for 1927 being 8,777. The returns received under the Public Health (Tuberculosis) Regulations, 1924, from the medical officers of health of the metropolitan boroughs show that there were 33,117 cases of pulmonary tuberculosis (18,553 males and 14,564 females), and 13,623 cases of other forms of tuberculosis (7,146 males and 6,477 females) on the registers of the metropolitan boroughs at the end of 1928. In the section devoted to a consideration of the Council's Tuberculosis Scheme valuable statistics are presented. The total number of adults admitted to institutions during 1928 was 5,087 as against 5,311 in 1927. With regard to children, the

number recommended for treatment under the Council's Tuberculosis Scheme during each of the last five years was respectively 1,019 in 1924, 1,025 in 1925, 1,163 in 1926, 1,190 in 1927, and 1,081 in 1928. There is now no waiting list either for pulmonary or surgical cases in children. Arrangements have also been made for the immediate admission to residential institutions of children suffering from tuberculosis of the hip, spine, and other joints. The number of tuberculous children under treatment on December 31, 1928, was 855, distributed as follows: Metropolitan Asylums Board institutions 629, and in voluntary institutions 226. The Council have also established seven open-air day schools, with accommodation for 540 children suffering from pulmonary tuberculosis or tuberculous glands, with no open wounds, who do not appear to need institutional treatment. The experimental scheme commenced in 1926, and continued throughout 1928, whereby artificial light treatment at certain hospitals and other centres was available, appears, however, from reports obtained from the tuberculosis officers of nineteen boroughs, to have been but little used, and is to be discontinued. At the same time the view is expressed that the best results are obtained when light treatment is given as an additional method of treatment under suitable conditions in residential institutions in the country, where all methods of treatment are available in addition to fresh air, good food, and a regular régime. Metropolitan Borough Councils are to be advised that all cases of active tuberculosis, whether pulmonary or non-pulmonary, and particularly in the early and remediable stages, should be provided with residential treatment at the earliest possible moment. With the co-operation of the Invalid Children's Aid Association arrangements are made for the boarding-out of children living in contact with cases of advanced pulmonary tuberculosis; during 1928, 149 children were so dealt with, and at the end of the year 52 children were being maintained under the scheme. Valuable work is being carried out by the Tuberculosis Care Committees, and among their activities in several boroughs is the organization of handicraft classes for dispensary patients, mainly for those who are unfit for ordinary employment. In the section relating to health conditions in school children Dr. F. N. Kay Menzies reports that pulmonary tuberculosis, definite or suspected, was recorded in only 127 children and other forms of tuberculosis in only 109, in each case being less than 1 in 1,000 of those inspected. The drop in the number of cases of surgical tuberculosis from 152 to 109 in spite of larger numbers inspected is noteworthy. In the seven open-air schools 1,826 children passed the whole or part of the year. Open-air classes, 171 in number, are attached to ordinary schools, and provide places for 5,010 children. In addition to the provision of treatment for tuberculous children in residential schools, there are seven open-air schools specifically for those notified under the Tuberculosis Regulations, 1912, as suffering from tuberculosis of the lungs or of glands, with no discharging sinuses; the number on the roll on December 31, 1928, was 614. The Tuberculosis Scheme of the L.C.C., prepared in 1914 and revised in October, 1922, has accomplished notable service; but now, in view of the readjustments necessitated by the new Local Government Act, will doubtless require considerable revision. The time has certainly arrived when the Government should undertake a national enquiry into the whole problem of tuberculosis.

CHILDREN IN TUBERCULOUS HOUSEHOLDS.

The "Lancashire Group" of Tuberculosis Officers, at the request of the Research Committee of the Joint Tuberculosis Council, has recently issued from the County Offices, Preston, and over the name of Dr. G. Lissant Cox, the convener, a valuable report on "The Fate of Young Children in Tuberculous Households." We venture to produce the following from the summary and conclusions:

1. The research embraces the analysis of the histories of 1,486 children in Lancashire under five years of age living in 1,063 homes, in each of which there were one or more adults suffering from tuberculosis. There has been no selection of cases by tuberculosis officers, and no undue proportion from any particular area or areas.

2. Of the children dealt with in this research, the substantial majority remained, throughout their period of observation, in constant contact with an adult tuberculous case in their homes, after allowing for those adults who received several months' institutional treatment and for a small number of children who were removed for varying short periods to the homes of relatives.

3. The death-rate from *non-pulmonary tuberculosis* of children exposed to risk in tuberculous households from an adult with *positive sputum* was greatly in excess of the rate from the same cause in the geographical county of Lancaster, serving as the "control," the rate being: Nine times greater in the age-group 0 to 1; fourteen times greater in the age-group 1 to 2; nineteen times greater in the age-group 2 to 5. This great excess of non-pulmonary tuberculosis is mainly due to deaths from tuberculous meningitis, which accounted for two-thirds the mortality in the non-pulmonary group, ages 0 to 5.

4. Similarly (although statistically insignificant owing to the probable error due to chance) the death-rate from *non-pulmonary tuberculosis* of children exposed to risk in tuberculous households with an adult case or cases suffering from pulmonary tuberculosis, with *negative or no sputum*, was also in excess of the rate from the same cause among children in the geographical county of Lancaster, the rate being: Three times greater in the age-group 0 to 1; four times greater in the age-group 1 to 2; ten times greater in the age-group 2 to 5.

5. The deaths from *pulmonary tuberculosis* of children exposed to risk in tuberculous households were too small upon which to base any conclusion.

6. The death-rate from *causes other than tuberculosis*, on the other hand, was appreciably less among the children aged 0 to 1 and 1 to 2 exposed to risk from an adult with pulmonary tuberculosis than in the corresponding child population in Lancashire. From 2 to 5 years, however, the position was reversed.

7. With regard to the deaths from *all causes*: (*a*) We have found that in the first year of life the children in tuberculous households had a death-rate significantly below the corresponding rate in Lancashire, 15 per cent. less when the infective case had a positive sputum, and 46 per cent. less when the sputum was negative or absent. This lower mortality of the children exposed to risk appears remarkable, but it must not be overlooked that the tuberculous household is under the supervision of the medical and nursing staffs, who are able to give advice as to the feeding and health of the children as well as to obtain

assistance for necessitous cases. In connection with this lower mortality from all causes in children under one year, Dr. C. W. Laird draws attention to the work of Professor Abderhalden, of Halle, who claims to have discovered proteolytic ferments in the blood of pregnant women which were not to be found apart from pregnancy. (*b*) Between 1 to 2 years, the death-rate was almost the same as the corresponding rate for Lancashire. (*c*) In age-group 2 to 5 years the death-rate was significantly higher—due in part to the much greater mortality from tuberculosis—among the children in tuberculous households than in the "control," being five times greater when the infective case had a positive sputum, and three times greater when negative or absent.

8. The mortality rate from tuberculosis was greater amongst the children of tuberculous positive sputum mothers than fathers.

9. Taking a period covering the whole first five years of life, those children who were in contact at home with an adult person suffering from pulmonary tuberculosis (whether sputum positive or negative) did not have a higher mortality from all causes when compared with the expectation of life of children in England and Wales.

10. The calculation made by Professor A. Calmette, that in France 24 per cent. of the children of tuberculous mothers die from tuberculosis in the first year of life if left with the mother, is many times higher than our Lancashire experience. This research shows that the death-rate from tuberculosis for corresponding Lancashire children was 3·2 per cent.; and, further, from all causes the rate was only 11·5 per cent.

11. Further, the Lancashire investigation shows for children observed from birth to four years of age a death-rate from tuberculosis, and from all causes, a little lower than the French figure for children observed from one month to four years vaccinated with "B.C.G."; and much lower than for the French children unvaccinated with "B.C.G."

NOTES AND RECORDS.

The Ministry of Health has just issued as No. 55 in the series of "Reports on Public Health and Medical Subjects" a report on "Infant Mortality," by Dame Janet Campbell, D.B.E., M.D., M.S., with Statistical Notes by Peter L. McKinley, M.D. (price 1s.). It is the English part of an international inquiry instituted by the Health Organization of the League of Nations, and contains records of an investigation carried out in four selected districts in this country regarding the deaths of infants. A number of suggestions are made for the consideration of responsible authorities.

"The Annual Report of the Surgeon-General of the Public Health Service of the United States," issued from the Government Printing Office, Washington, contains much valuable information regarding many forms of disease and the study of health problems. Reference is made to the isolation of the protein fraction responsible for the tuberculin reaction; it has been prepared from a human strain isolated first by Trudeau at Saranac Lake, and now called Hygienic Laboratory strain H. 37.

Dr. Willoughby, Medical Officer of Health for the City of London, in his last Report states that among forty-eight samples of milk

coming from seven different counties or districts, no less than 8·3 per cent., or 1 in 12, were tuberculous. During the past twenty-four years the percentages of tuberculous results have varied from 26·3 in 1921 to 2·4 in 1925.

Dr. Bernard Hudson of the Victoria Sanatorium, Davos-Platz, informs us that he and his wife are establishing above Davos a small home for delicate children and young people predisposed to tuberculosis, and will be glad to hear from any doctor desiring to send suitable individuals.

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